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MODERN DIETARY TREATMENT

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MODERN DIETARY TREATMENT

BY

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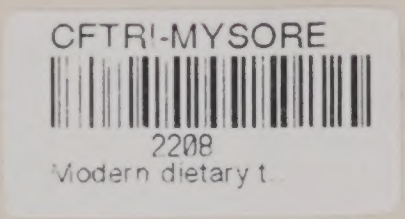

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PREFACE TO THE THIRD EDITION

THE past ten years have seen great changes in our attitude towards the science of nutrition. The shortage of food during the war made it necessary to consider the nutritional value of every ounce of food imported into the United Kingdom. By using all the available knowledge it became possible to feed the population of the country so well that the general level of health actually improved between 1939 and 1946. In the struggle to secure enough to eat Calories came into their own again, and foods which were thought little of in 1939 became the mainstay of our diets.

Rationing and subsidies have done so much to make the diets of rich and poor alike that for the time being the A and B diets at two levels of cost have been abandoned, and one diet with a wider choice of foods and dishes in it has been substituted. Much of the text has been revised and extended in the light of modern knowledge. More recipes have been added and many of the tables, particularly the tables of the chemical composition of foods and of vitamins, have been considerably altered and brought up to date.

Before preparing this edition for the Press, dietitians in all the London teaching hospitals and in Edinburgh, Glasgow, Leeds, Birmingham, Oxford, Cambridge and Reading were visited and were asked for their criticisms and suggestions. Many of them gave much time and thought to this and have helped us greatly. We should like to express our appreciation to each one. Miss Mary Spargo has been responsible for the revision of most of the diets in Chapter XII. Her co-operation has been invaluable to us and we are very grateful to her for all she has done.

CAMBRIDGE,
July, 1951.

MARGERY ABRAHAMS.
ELSIE M. WIDDOWSON.

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CHAPTER I

THE NORMAL DIET

1. Calories, Protein, Fat, and Carbohydrate

Nutritional research has now come to occupy a dominant position in the study of problems connected with health and with disease. Fifty years ago it was generally assumed that if people had sufficient food to satisfy their appetites they could be considered adequately nourished. Whatever disease or ill-health existed was attributed to heredity or environment, or to some other factor in which nutrition played no part. By 1920, however, it was realised that the mere satisfaction of appetite was not enough, and that the absence of substances which add almost nothing to the bulk of the food might make the whole difference between health and disease, and even between life and death. A great deal of ill-health and inefficiency in the past has been due without doubt to faulty nutrition. Improvement in the health of the nation has come about in recent times as a consequence of our improved habits of feeding. As an example of one of the first of such improvements, reference may be made to rickets. Before the First World War severe rickets was very prevalent in our large towns, and as a result many people suffered from physical deformities and were often crippled for life. At that time many babies were brought up largely on floury substitutes for milk and on evaporated skimmed milk. Between the two wars rickets became a comparatively rare disease. This was partly because babies were exposed more to the sun, but the appreciation of the importance of vitamin D and whole milk in the diet of young children was an even more important factor. The prevention of rickets and other nutritional diseases of infants was

undertaken and popularised during the Second World War by the Ministry of Food. Infants were given special allowances and priorities of milk, cod-liver oil, and orange juice obtainable on their own ration books. Such developments as the milk-in-schools scheme, the extension of school meals, and the establishment of canteens in factories, and of British Restaurants, were advances in preventive medicine directed towards maintaining a satisfactory nutritional standard in the community. Emphasis in the past has been laid on disease and the cure of disease, but it is now realised that the establishment and maintenance of health are of even greater importance.

CALORIES

The constituents of a normal diet may be divided into six classes:

1. Proteins.
2. Fats.
3. Carbohydrates.
4. Water.
5. Minerals.
6. Vitamins.

Of these the first three, carbohydrates, fats, and proteins, are the fuel or energy-producing substances. Alcohol, which also supplies energy under certain conditions, is discussed on p. 17. The energy derived from the combustion of food is used to keep all the cells of the body alive and active. Some of the energy appears as muscular movement. Every muscular movement, whether voluntary like walking, or involuntary like the beating of the heart, uses up energy, and this energy is obtained by the combustion of food. The energy required to produce the secretions of the body is derived from the same source.

A great deal of the energy derived from the food, however, does not appear as work but as heat. This heat maintains

the body at 98·4 deg. F., a temperature considerably above that of the surrounding atmosphere, and heat is continually being lost from the body to the cooler air. The body temperature would rise much higher if it were not for the heat-regulating mechanisms which maintain it at or about that level. If these were to fail, and the person was completely insulated against heat loss, he would reach boiling point in about two days !

The fuel value of a food is measured in *Calories*. A Calorie is defined as "the amount of heat required to raise the temperature of 1 litre of water (about $1\frac{3}{4}$ pints) through 1 deg. C. (1·8 deg. F.)." A special apparatus called a calorimeter has been devised for the measurement of calorific values. A known weight of carbohydrate, fat, or protein is burned in the calorimeter and the heat that it gives out can be measured. Fat and carbohydrate are completely oxidised in the body to carbon dioxide and water, and the amounts of heat produced by the combustion of fat and carbohydrate in the body are the same as the amounts produced when these substances are burned in the bomb calorimeter. One gram of fat produces 9·45 Calories, and 1 gram of glucose or other monosaccharide 3·75 Calories. Protein, however, which is oxidised in the calorimeter to nitrogen, carbon dioxide, and water, is incompletely oxidised in the body. No free nitrogen is produced, but urea and other organic nitrogenous compounds. One gram of protein in the bomb calorimeter produces 5·65 Calories. One gram of protein in the body produces 4·35 Calories. Hence the calorie value of a foodstuff containing protein as determined in the bomb calorimeter is always higher than the calorie value of that food to the human body. Furthermore, cellulose and other materials making up the cell walls of plants, which are not available as carbohydrate to the human body, are oxidised in the calorimeter just as readily as starch and sugar.

In assessing the energy value of different foods or diets the physiological energy value should be taken as the basis. In

some food tables the factors 4, 9, and 4 have been chosen to convert protein, fat, and carbohydrate figures to Calories. These " Atwater " factors are quick and easy to use since they are round numbers, but they were designed for mixed diets and not for individual foods, and they allow for losses in digestion. In the tables given in this book Rubner's factors, 4·1 for protein, 9·3 for fat, 3·75 for glucose (or 4·2 if the carbohydrate has been expressed as starch), and 7·0 for alcohol have always been used.

100 Calorie Portions

The following list shows the comparative calorific values of some common foodstuffs. Each portion will give 100 Calories. The smaller the weight, therefore, the higher the calorific value of that particular food.

Butter	½ oz.
Bacon, fried	⅔ oz.
Chocolate	⅔ oz.
Sugar	⅘ oz.
Bread	1½ oz.
Beef, roast	1½ oz.
Eggs	1½ eggs
Potatoes, boiled	4 oz.
Milk	5 oz.
Apples	9 oz.
Tomatoes	20 oz.
Cabbage	50 oz.

Respiratory Quotient

Since the relative amounts of oxygen and carbon in the molecules of the three dietary constituents, protein, fat, and carbohydrate, are different, the relative volumes of oxygen consumed and carbon dioxide produced during the metabolism of each of them also varies. The ratio $\frac{\text{Volume of } CO_2 \text{ expired}}{\text{Volume of } O_2 \text{ inspired}}$ is called the respiratory

quotient, or R.Q. The R.Q. of protein is 0·80, of fat 0·71, of carbohydrate 1·00, and of alcohol 0·67. On an ordinary mixed diet the respiratory quotient is about 0·85.

Basal Metabolism

Basal metabolism is the metabolism of the body at complete physical rest in a room of ordinary comfortable temperature, twelve to eighteen hours after the last meal. It is usually measured in terms of energy, and the units employed (Calories) are units of heat. Other forms of energy may be measured in the same terms. Many determinations have been made of the number of Calories required for the basal metabolism of men, women, and children of different ages. The calorie requirement for basal metabolism will vary with the size and surface area of the body, a large body needing more fuel to maintain it than a small one. It has been found that the energy metabolism of the body increases in proportion to the surface rather than the weight. Values for energy requirements for basal metabolism are therefore more accurately expressed in terms of Calories per square metre of body surface than in terms of height or weight. Tables for predicting the basal metabolism of normal adults and children of various ages have been drawn up by several workers. One is given on p. 311, and a nomograph for calculating the surface area on p. 310. In terms of surface area, both men and women require about 40 Calories per square metre per hour. In terms of body weight, a normal healthy man weighing 70 kg. (11 stone) requires 77 Calories per hour for basal metabolism, while a woman weighing 57 kg. (9 stone) needs 60 Calories. In twenty-four hours, therefore, the man needs 1,850 Calories and the woman 1,440 Calories for basal metabolism. Thus, more than half the 2,000–3,000 Calories per day normally obtained from the ingested food are used for basal metabolism.

The true basal metabolism of infants is difficult to determine since a hungry baby will not be at " complete physical

rest." The so-called basal metabolism of babies is their metabolism at physical rest, but it includes the influence of food. During infancy the basal metabolism is 30 to 50 Calories per square metre per hour (2·0 to 2·5 Calories per kg. per hour), but it rises rapidly to a value of 60 Calories per square metre per hour at the age of one to two years, then falls till it reaches the adult figure of 40 at the age of twenty. In old age the basal metabolism is diminished, and at ninety years has a value of about 32 Calories per square metre per hour.

Prolonged under-nutrition lowers basal metabolism, so that in times of severe food shortage people are able to survive on diets providing fewer Calories than one would expect to be adequate to maintain life. The thyroid gland exerts a profound influence upon basal metabolism, and when this gland is over-active, the basal metabolism may be raised as much as 75 per cent., while in myxœdema and cretinism it is considerably reduced. During fever the basal metabolism is raised 7·2 per cent. for each degree Fahrenheit rise in temperature (13 per cent. for each degree Centigrade).

It must be pointed out, however, that a basal metabolism 10 per cent. below to 15 per cent. above the average figures is usually considered within the normal range.

Total Energy Requirements

In addition to the Calories required for basal metabolism, food is needed to supply energy for muscular movement. Even light muscular exertion, sitting, standing, dressing, and undressing, raises the metabolism by from 25 to 60 per cent. above the basal level. Exercise such as walking, swimming, and housework may raise it 100 to 200 per cent.

The total calorie requirement of human beings is a question which has received a considerable amount of attention. The problem has been investigated by three different methods. The first is by means of the human calorimeter. With the

aid of this instrument it is possible to determine the energy output of persons at rest or carrying out various occupations inside it. The second method consists in the measurement, with a portable apparatus, of the amount of oxygen required to oxidise the ingested food while the subject is performing various kinds of work. The third consists in studying the number of Calories which adults or children are instinctively taking in their food to maintain themselves in normal health, when there are no restrictions due to economy or any other cause.

There is general agreement that the average man, weighing about 70 kg. (11 stone) and leading a moderately active life, needs an amount of food which will yield 3,000 Calories a day. Since diets can be measured in terms of energy, and the bodily activities can also be assessed on this basis, the two can be directly compared, and it has been shown that the more active the life the more energy must the daily food provide. For a purely sedentary life a man requires about 2,400 Calories a day. For really hard physical work, such as coal mining, stone cutting, and dock labouring, about 4,000 Calories a day are needed. During special athletic efforts a tremendous amount of energy is expended. Mental work, on the other hand, seems to demand no extra intake of food. On p. 315 is given a table showing the approximate calorie requirements of individuals performing various occupations.

Women need less food than men, for they are as a rule smaller and less muscular. It is usually stated that the average woman, who weighs five-sixths as much as the average man, requires five-sixths as many Calories, or 2,500 per day. Her " man-value " is said to be 0·83. Studies on the diets of individual women have shown that the average calorie intake of 63 middle-class women before the recent war was about 2,100 a day, or 0·7 of 3,000 Calories, and they seemed to need fewer Calories per kilogram of body weight than did a corresponding group of men.

The general build of the body regulates to some extent the amount of food needed, for a short stout man loses heat at a slower rate than a tall thin one of the same weight, and therefore will require relatively less heat-producing food to maintain his body temperature.

Climate and season have a certain amount of effect on the kind and quantity of food required. In cold parts of the world, and even in winter in this country, more food, and especially more fat, is often eaten than during hot weather. The seasonal variation in the food eaten in this country is probably a variation in kind rather than in quantity. In tropical regions, however, the basic calorie requirement appears to be lower than in the cold countries.

After about sixty years of age the bodily activities are restricted, and overfeeding should be avoided. Over the age of seventy about 1,800 Calories a day are usually sufficient.

While the general principles that have just been described are undoubtedly true, it must always be remembered that individuals vary enormously and unpredictably in their food habits. One person will habitually eat twice as much as another of the same age, sex, size, and occupation, and neither will gain or lose weight. These individual variations in calorie intakes must mean that people also have very different calorie requirements, and any statement about average calorie requirements may be far from the truth for an individual person.

During and after the recent war the populations of many European countries were forced to live on rations providing far fewer Calories than are usually considered adequate. Men and women whose diets provided only 1,000 or 1,200 Calories a day invariably lost weight. The fact that some people remained apparently perfectly nourished is no proof that the scales of calorie requirements are wrong, but is a sure sign that they were getting extra foodstuffs outside the ration. In closed communities such as prisons, where there were no means of getting additional food, an

inadequate calorie intake always produced the characteristic signs of under-nutrition.

Calorie Requirements for Children

The greatest contributions to the knowledge of the energy requirements of children have been made by dietary studies in which the intake of food has been measured. Calorimetry or respiration studies on children are difficult and have not been carried out on a sufficiently large scale. Balance experiments have been made, but in most cases, although the foods were completely analysed, only excretion of nitrogen has been determined.

Dietary studies have been carried out by two different methods—on groups of children in institutions, and on individual children living either in institutions or in their own homes. The group method cannot profess to do more than supply a rough average of the food intake. The measurement of the individual food intake of healthy children of varying ages is obviously the most satisfactory method of approach to the problem.

A survey of the diets of more than 1,000 individual British children living in their own homes, before the recent war, showed that children vary just as much as adults in the amounts of food they eat. Their average calorie intakes are given on p. 314. It is interesting that from the age of six years boys always ate more than girls. It is also noteworthy that these average calorie intakes were higher at all ages than the recommended calorie allowances of the U.S. National Research Council (p. 312).

PROTEINS

The most obvious function of food is to supply the new material which is required for growth. A baby should double its birth weight in the first six months of its life, and treble it in the first year. An adult's weight is about twenty times his birth weight, so that food has much to accomplish.

Chief among the materials needed to build body tissues is protein. All living tissues contain proteins, and they are essential constituents of the nucleus and protoplasm of every cell. Protein is needed for replacement and repair, even when no new tissue is being built. The metabolism of the cell results in some breaking down of protein, and the nitrogenous end products are excreted in the urine. The urine always contains nitrogen, even if the diet contains none.

Proteins contain carbon, hydrogen, oxygen, nitrogen and sulphur. They are essential for building and repairing every tissue of the body, and are also a source of fuel or Calories. Animals cannot build up their own body proteins from simple inorganic materials as plants can, and hence they require an adequate supply of proteins in their food.

There are many different proteins in animals and plants, but they are similar to one another in that they are all built up by the combination of a number of simpler chemical units. The latter are termed amino-acids, and each contains one or more atoms of nitrogen. Twenty-six different amino-acids have been isolated, and these are present in varying proportions in the different proteins. At least eight of these acids, tryptophane, lysine, valine, methionine, threonine, leucine, isoleucine, and phenylalanine, have been proved to be absolutely essential for the maintenance of health. A protein which contains each one of these in adequate amounts could be used as the sole source of nitrogen in the diet.

Proteins derived from animal sources—meat, fish, milk, cheese, and eggs—approximate more nearly to human flesh protein than the proteins derived from vegetable sources, and they are more likely to contain the essential amino-acids. They are often called "first-class proteins." Gelatin, however, is incomplete, for it contains no tryptophane, valine, or isoleucine. Foods of plant origin generally contain less protein than those of animal origin, but this is not always the case. They may, however, contain inadequate

amounts of some of the essential amino-acids, and they are frequently called " second-class proteins." The amino-acid composition of some common food is given in Table V, p. 302.

In an ordinary mixed diet in which protein is derived from a variety of sources, the shortage of an amino-acid in one particular food should be made up by its presence in ample amount in another. Most foods, moreover, contain more than one protein, and these proteins often supplement one another. The terms " first-class " and " second-class " protein, therefore, are not to be recommended, for a first-class diet might contain little or no animal protein.

Protein Requirements

There is no agreed standard of protein intake. It is generally accepted, however, that for the average man 100 grams per day is an ample allowance. Sherman proposed 1 gram of protein per kilogram of body weight per day (roughly $\frac{1}{2}$ gram per lb.), or 70 grams for the average man, as a suitable standard of protein needs. This figure was also adopted by the Health Organisation of the League of Nations, 1936.

The U.S. National Research Council recommends 70 grams a day for men and 60 grams a day for women. An investigation on the individual food intakes of London women before the recent war showed that their average protein intake was about 67 grams a day. The results of dietary surveys in various parts of the world all go to show that the majority of mankind take 10–15 per cent. of their Calories in the form of protein. It used to be thought that 37–50 grams of the daily protein should come from animal sources. It now seems certain that suitable mixtures of plant proteins may be as valuable nutritionally as animal proteins, so long as they contain all the essential amino-acids in adequate amounts.

Children need relatively more protein than adults. A baby fed on human milk usually receives 2 to 2·5 grams of protein per kilogram of body weight per day (approximately

1 gram per lb.), and it must be remembered that this is entirely in the form of milk proteins, which are of high biological value.

The National Research Council recommends 3·5 grams per kilogram up to the age of one year. For older children the allowances are given in total daily amounts, increasing from 40 grams at 1–3 years to 70 grams at 10–12 years, and still higher intakes are recommended for adolescents. The average protein intakes of the British children to whom reference has already been made were very close to these recommended allowances.

FATS

Fats are composed of carbon, hydrogen, and oxygen. Some of the complicated fat-like substances such as lecithin, which is present in brain and other nervous tissue, contain phosphorus and nitrogen as well.

Fats are foods with a high fuel value, since 1 gram of fat provides more than twice as many Calories as 1 gram of carbohydrate or of protein. It was formerly thought that the fat in food was only used as a source of energy, but it is now realised that fats enter into many vital processes, *e.g.* the construction of cell walls and nervous tissue. Some of the fat taken in the food may be used for such purposes. It is known, however, that the body can convert carbohydrate to fat and that very low fat diets are compatible with health over long periods of time, provided the intake of fat-soluble vitamins is well maintained.

Each molecule of a simple fat consists of one molecule of glycerol united to three molecules of fatty acids. The fatty acids may be saturated or unsaturated compounds, and the basis of the fatty acid structure is a chain of four to sixteen, eighteen, or twenty carbon atoms—always an even number. For health, rats require certain unsaturated fatty acids to be provided for them in their food, but human requirements in this respect are not yet known. When fats are burned in the

body the carbon atoms are broken off two at a time, so that the last stage is the splitting of the four-carbon residue into two equal halves. It is this which appears to fail when carbohydrates are not being metabolised, and it is the presence of these half-broken four-carbon residues in the blood which gives rise to ketosis.

Fat may be obtained from animal or vegetable foods. In either case it is well digested, absorbed and metabolised in the body. Butter, lard, dripping, suet, and fat of meat are typical animal fats. Cheese, eggs, and some fish also contain fat. Vegetable fats include olive oil and some kinds of margarine, and most frying oil used commercially is derived from vegetable sources. Soya beans and many nuts contain a high percentage of fat.

CARBOHYDRATES

Carbohydrates are composed of carbon, hydrogen, and oxygen, and their use is mainly as fuel, but in small quantities they play a vital part in cell structure, in certain secretions, and in the production of immunity. Carbohydrates may be divided into two main classes, simple soluble carbohydrates or sugars, and less soluble complex carbohydrates such as starch, cellulose, etc. The sugars may again be subdivided into the simpler monosaccharides and the disaccharides. The latter consist of two monosaccharide molecules linked together.

Simple Carbohydrates. Sugars

Monosaccharides

Glucose or dextrose. This is the sugar which is present in the blood, and it is the substance to which all carbohydrate in the food is ultimately converted. Glucose occurs naturally in fruits and vegetables and in honey. Its therapeutic use has increased rapidly during the recent years, chiefly because it is not quite so sweet as cane sugar and therefore can be added in larger amounts to fluid diets without spoiling their flavour.

Fructose or lævulose also occurs in fruits and in honey. It is absorbed as such, but appears to be converted to glycogen soon afterwards.

Disaccharides

Cane sugar or sucrose. This consists of a glucose molecule and a fructose molecule linked together. It is formed naturally in the sugar cane and sugar beet, from which it is prepared commercially. It is also present in many fruits and vegetables. Syrup and treacle contain about 70 per cent. of cane sugar. Sucrose has not been found in the human body.

Lactose is the sugar which is present in milk. It is a disaccharide, each molecule consisting of one glucose and one galactose molecule. It is not very sweet, and it is therefore often used to increase the calorie value of infants' and invalids' diets.

Maltose consists of two molecules of glucose. It is formed by the hydrolysis or fermentation of starch. Malt extracts and foods prepared from them contain varying amounts of maltose, and this sugar is also present in beer and stout.

Complex Carbohydrates

Starch. Starch is a polysaccharide consisting of a large number of glucose molecules combined together. Cereal foods, flour, rice, oatmeal, etc., contain 70 to 90 per cent. of starch. It is also found in smaller quantities in many vegetables, especially potatoes, parsnips, peas, and beans, and in chestnuts and unripe bananas.

Sugars and starch, which may be termed "available" carbohydrates, are all of approximately equal nutritive value, and so long as the digestive system is in good order it matters little in which form the carbohydrate is taken. Infants are not usually given starchy foods until they are six months old, for until that age their digestive secretions do not break down the large starch molecule satisfactorily.

Cellulose forms the cell walls of plants, and whole cereals and vegetables are the chief source in human diets. It is of little direct nutritive value to man, as the human alimentary tract contains no enzymes capable of digesting it. Its main function is to form part of the so-called " roughage " which is beneficial for the normal functioning of the digestive tract.

Other complex carbohydrates. Besides starch and cellulose, other complex carbohydrates occur in plant foodstuffs, *e.g.* inulin in artichokes and pectin in fruits. Nuts and soya beans also contain considerable amounts of various polysaccharides. Very little is known as to the availability of these carbohydrates to the human body, but the probability is that the products of their bacterial breakdown in the intestine are fatty acids of low molecular weight rather than monosaccharides.

WATER

All the chemical reactions which together constitute life take place in a fluid medium. Life without water, therefore, is an impossibility. The body of an adult contains some 60 per cent. of water; the body at birth contains a higher proportion, and a fall in the percentage of water is one of the chemical characteristics of growth.

We get the water for our daily needs from three main sources. The first and most obvious of these is the water, coffee, tea, beer, soup, or other liquid which we drink. The second is the water in the so-called solid food. This may be a considerable amount, for some foods which look very solid contain a surprising quantity of water. Cabbages and marrows, for instance, may contain 95 per cent. of water, and apples as much as 90 per cent. Meat is rather more and bread not much less than half water. The third source is the water formed during the combustion of the food materials, for all of them are normally burned to carbon dioxide and water. A gram of protein or sugar burns to half a c.c. of water, and a gram of fat to 1 c.c., so that the metabolism of

100 grams of protein, 100 grams of fat, and 400 grams of carbohydrate will give rise to about 300 c.c. of water. This is not enough for a man's daily needs, but some insects such as clothes moths are able to live on the water which they derive from the oxidation of their food.

If we are to remain efficient, we must be supplied with enough water to replace the large amounts which we lose daily through the lungs, kidneys, and skin. The air expired by the lungs is always saturated with water vapour, and about 400 c.c. are given off daily in this way by a person taking very little exercise. In a temperate climate about 600 c.c. are lost by the skin, but in a hot climate a man may lose 14 litres by the skin in the course of the day, and all this loss is essential if he is to survive, for were he to stop sweating his temperature would rapidly rise to a level that was incompatible with life.

When sweating is very profuse and continuous, considerable amounts of salt may be lost as well as water. If water is now drunk freely, it may so dilute the body fluids that severe cramps and serious illness may result. This can be prevented by the simple expedient of adding a small quantity of salt to the drinking water of men who are working in very hot atmospheres.

The human kidney is forced to pass out about 500 c.c. of water a day with the urea and other solids which it excretes. The rest of the water excreted by the kidney may be regarded as the surplus of intake over essential requirements. This surplus varies between 200 and 2,000 c.c. a day, whatever the work or climate, which shows how well the requirement is normally regulated by the desire to drink. The fæces contain about 100 c.c. of water a day, so the minimum daily water requirement must be considered to be of the order of 1,600 c.c.

In times of war, men and women are sometimes forced to live for many days, and even weeks, in open boats, and the question of drinking sea water comes up again and again.

Sea water may be regarded as a 3 per cent. solution of salt, the fluids bathing the cells of the body as a 1 per cent. solution. The kidney can excrete a 2 per cent. solution of salt but no more, so that taking sea water by mouth can only lead to a concentration of the body fluids. Of things which are essential to life, water is second only to air, and it should always be given precedence over food in lifeboats and rafts when space is limited. Without air we cannot live for more than a few minutes. If air is supplied but food and water are withheld, we cannot live for more than eight or ten days. But if we have no food other than air and water, life can be maintained for a considerable time. Some years ago the Lord Mayor of Cork performed a hunger strike, and is stated to have lived on nothing but water for 70 days before he died of starvation.

ROUGHAGE

Roughage cannot be considered as a dietary essential in the same way that proteins, fats, carbohydrates, minerals, vitamins, and water are essential, and it is an interesting point that milk, which is the natural food for infants and young animals, contains practically no roughage at all. Roughage is derived largely from the cellulose forming the cell walls of plants, and animal foods as a whole leave much less undigested residue than plant foods. A certain amount of roughage in the diet is probably an advantage, and constipation tends to arise if the diet is almost completely absorbed. There is no evidence whatever that the compulsory change in 1942 from white bread to bread made from 85 per cent. extraction flour had any harmful effects, and persons with intestinal disorders appeared to be able to tolerate perfectly well the small amount of roughage in the National Bread.

ALCOHOL

Alcohol in an impure form has been known since the earliest times, and as far back as the history of medicine

extends it has been used as a drug. Its value depends upon four chief points:

1. Its local irritant action.
2. Its action on the central nervous system.
3. Its action on the circulation.
4. Its value as a food.

1. **Local irritant action.** When alcohol is taken in moderate amounts it increases the secretion of gastric juice in the stomach. It does not, however, increase the secretion of pepsin, nor does it affect the muscular movements of the stomach. To some people it is an aid to digestion, while to others it is not. Generally speaking, it may be said that, if it is enjoyed, alcohol in moderate quantities may be considered to be harmless to the digestion of those in normal health. Excessive quantities, however, give rise to profuse secretion of mucous in the stomach, gastric catarrh, and digestive disorders.

2. **Action on the central nervous system.** This is by far the most important action. In spite of the feelings of well-being, good fellowship, and self-confidence to which it gives rise, alcohol has never been shown to stimulate any part of the central nervous system. The observed effects are due to a depression or retardation of the highest centres, which normally exert a restraining influence on the rest of the brain. The well-known effects of alcohol, therefore, may be ascribed to a lack of restraint. Large doses retard the higher centres still more, and lead to obvious blunting of the finer senses and clumsy performance of movements demanding speed and skill.

Large amounts of alcohol result in complete inco-ordination, deep, torpid sleep, and finally unconsciousness. The effects of alcohol vary greatly in different individuals and in the same individual at different times. Chronic alcoholism has been thought by many to lead to cirrhosis of the liver. Alcohol addicts are also liable to peripheral neuritis, which can be cured by giving vitamin B_1.

3. **Action on the circulation.** If administered in small doses to people not in the habit of taking it, alcohol gives rise to slight acceleration of the pulse rate. It is believed by some to have a stimulating action upon the heart, but the change is small and inconstant. Large quantities make the heart beat more slowly.

The familiar flushing of the skin and feeling of warmth indicate dilation of the superficial blood-vessels, but the main blood-vessels are scarcely affected.

4. **Value as a food.** Alcohol in moderate doses is oxidised almost completely in the body, and each gram yields seven Calories. From this point of view, therefore, it must be classed as a food. The rate of combustion is, however, rather slow. It takes an hour to oxidise the amount contained in $3\frac{1}{2}$ oz. of vin ordinaire, or in $\frac{1}{2}$ oz. of Benedictine. If taken with carbohydrates and fats, alcohol is preferentially oxidised and the carbohydrates and fats are stored.

All authorities are agreed that for healthy persons alcohol is a luxury. It may coax a jaded palate, and as a flavouring agent it adds variety to the menu. It is, however, entirely unnecessary for growth and maintenance of the body.

The use of alcohol in fever is discussed on p. 58.

CHAPTER II

THE NORMAL DIET (cont.)

2. Minerals and Vitamins

MINERALS

The body contains at least fourteen different mineral elements which are essential for life. About one-twentieth of the body weight consists of mineral matter, and an adult's bones alone contain approximately 6 lb. Minerals are lost from the body daily through the kidneys and skin and in the fæces, and these losses must be replaced from the food, but the minerals, like the vitamins, are not taken into consideration when calculating the fuel or energy value of a diet. Relatively small amounts only of these salts are required, but they are of such importance that death may result if these small amounts are withheld.

The minerals may be considered to perform several different functions in the body:

1. They build up the bones and the teeth.
2. They are an essential constituent of every cell in the body, and they must be present in the correct proportions.
3. They form an integral part of all the circulating fluids in the body, the blood and the lymph, the spinal fluids, and the digestive juices. These fluids bathe all the cells and supply the necessary acidity and alkalinity of the digestive juices and blood.

In children the intake of minerals must exceed the excretion if normal growth is to continue.

The minerals in the body are sodium, potassium, calcium, magnesium, iron, copper, manganese, zinc, cobalt, phosphorus, sulphur, chlorine, iodine, and fluorine. Tin,

silver, arsenic, and bromine also occur in animal tissues, but so far as is known they have no biological function.

From the dietetic point of view, the most important minerals are those of which there is likely to be a shortage. These are calcium and iron and, in some districts, iodine. If the diet provides these in adequate amounts, the other minerals can usually be left to look after themselves.

The amount of each mineral which is present in different foods varies a great deal. A food which is a good source of one mineral element is often a poor source of another. Milk, for instance, is rich in calcium and phosphorus but contains only a small percentage of iron.

Sodium and chlorine may be considered together since the supplies of these elements are obtained mainly in the form of sodium chloride or common salt, of which about 10 to 15 grams are usually taken daily.

Inside the body, however, these two elements do not always remain in association. About a quarter of the sodium in the blood is present there as the alkaline sodium bicarbonate and the chlorine previously ingested with this sodium has probably been excreted in the urine. Chlorine is separated from sodium in the walls of the stomach, and is secreted as hydrochloric acid in the gastric juice. The sodium left behind is combined with bicarbonate and secreted as such in the pancreatic juice.

Milk contains enough sodium and chlorine for the growing baby, and on animal foods alone it would be quite possible to live in temperate climates without added salt. People who live in the tropics and workers in hot atmospheres lose a great deal of sodium chloride in their sweat. If they do not take sufficient salt to make good this loss they may suffer from cramps and other signs of salt deficiency. Plant foods contain much less sodium than animal foods and relatively more potassium. The amount of potassium in a fruit or vegetable may be a hundred times the amount of sodium, and only the merest traces of chlorine may be present.

Potassium is an essential constituent of all the cells in the body. There is also potassium in the serum and lymph and this, though small in amount, is very important. The heart does not beat regularly and rhythmically unless the fluid outside the muscle cells contains the correct concentrations of potassium and calcium. The level of potassium in the serum is partly controlled by the activity of the suprarenal cortex, and if this function fails, as in Addison's disease, the serum potassium may rise to levels which endanger life. Potassium moves in and out of the cells under the influence of insulin and carbohydrate metabolism, and in a rare metabolic disease, familial periodic paralysis, so much potassium may enter the cells that the serum potassium falls to very low levels.

It is unnecessary to consider potassium in normal human diets, because there is no fear of a deficiency, and an excess is easily removed through the kidneys.

Calcium. The adult body contains more than a kilogram of calcium, and this is present mainly in the bones and teeth. An abundant supply of calcium is obviously needed whenever active bone growth is taking place. Without calcium in the body fluids the blood would not clot, the heart would not beat, and few of the body cells could function. The metabolism of calcium is regulated by the parathyroid glands and also by vitamin D.

The chemical properties of calcium render it liable to precipitation in the intestine. It is well known to form an insoluble oxalate, and if the diet includes foods containing oxalates, such as spinach or rhubarb (see Table VI, p. 304), a chemically equivalent amount of calcium will be precipitated in the intestine, and little of it will be absorbed. Whole cereals, such as oatmeal and wholemeal flour, and, to a lesser extent, National wheatmeal flour, contain an organic phosphorus compound, phytic acid, which also forms an insoluble calcium salt, and these foods therefore hinder the absorption of calcium. This does not matter if the calcium

intake is high and relatively small amounts of bread are eaten, but during the last war, when milk and cheese were in short supply, it became a matter of practical importance. It was for this reason that it was decided in 1942 to fortify the National Loaf with calcium.

Foods rich in calcium are cheese, milk, eggs, green-leaf vegetables, and nuts. For detailed list see pp. 42–45 and Table I, p. 269.

Most authorities agree that children up to the age of twelve should have at least 1 gram of calcium a day, and 1·3 or 1·4 grams during adolescence. Adults need less, and an allowance of 0·7 or 0·8 grams a day is usually recommended. If the diet contains much unfortified brown bread, all these allowances will need to be increased, at the rate of 0·1 grams of calcium for each $2\frac{1}{2}$ oz. of bread. The calcium in one pint of milk will just about balance the phytic acid in one pound of unfortified wholemeal bread.

Magnesium. Magnesium is one of the essential inorganic elements, and comparatively large amounts of it are required. The muscles, for example, and most of the soft tissues contain about three times as much magnesium as calcium, and the bones contain a little. It is used by the body in phosphate and carbohydrate metabolism.

When young animals are totally deprived of magnesium, lesions of the blood vessels and nervous system soon appear. Chronic shortage leads to defective bones and teeth, but human deficiencies need not be anticipated, for all foods contain salts of this metal and they are readily absorbed.

Iron. Most of the iron in the body is to be found in the blood as part of the red pigment, hæmoglobin. The remainder is scattered throughout the cells of the body and plays an important part in their respiration.

A deficiency of iron leads to a deficiency of hæmoglobin and this gives rise to anæmia. Anæmia is not always due to a deficiency of iron in the diet, but iron deficiency, if sufficiently prolonged and severe, invariably leads to anæmia.

The daily requirement of iron for both men and women is thought to be about 10 to 15 mg. Women lose about 15 per cent. of the month's intake of iron during menstruation, so that the consequences of an inadequate supply will show themselves more rapidly in woman than in men. The pregnant woman requires additional iron for the developing fœtus. A newborn baby contains about 300 milligrams of iron, and the placenta 70 mg. Most of this iron is laid down during the last two months of pregnancy, and the mother should be particularly well supplied with iron in her diet during this time. Milk is a comparatively poor source of iron, and babies are apt to become anæmic during the suckling period. The anæmia can be prevented or cured by giving large doses of iron. This treatment cannot be considered to be in any sense physiological, though it has been claimed to have a beneficial effect on the general health and resistance to infection.

It now seems certain that the human body has no physiological method of regulating the excretion of iron, and, in fact, very little is ever excreted. The amount absorbed is also very small, and once iron is absorbed, it is retained within the body, and is stored in the liver, spleen, and bone marrow. This being so, the iron requirement of men who are no longer growing, and who have no blood loss, cannot be very great. Iron-deficiency anæmia probably never occurs in men simply and solely as a result of an inadequate iron intake.

The main sources of iron are meat, especially liver, eggs, brown bread and oatmeal, and green vegetables. A detailed list is given on pp. 42–45 and in Table I, p. 269. The iron intake may be greatly increased by iron derived from cooking utensils such as chipped enamel saucepans.

Copper. It has been found that for the prevention and cure of anæmia, copper is essential as well as iron. The daily requirement of copper has not been definitely discovered, but the quantity is certainly very minute. Some diseases of ruminents have been proved to be due to a lack

of copper, but there is no evidence of a likelihood of copper deficiency in human diets which are otherwise adequate.

Zinc has been shown to have a definite function in the body. It forms part of an enzyme, carbonic anhydrase, which is found in red blood cells, in the mucous membrane of the stomach, and the pancreas. This enzyme plays an important part in the transport of carbon dioxide by the blood. Zinc is stored in the liver; hair, nails, teeth, and bones also contain comparatively large amounts. The daily intake of zinc is thought to be about 12 mg., but there has never been any suggestion that zinc deficiency is likely to occur in this country. Whole cereals, liver, egg yolk, pulses, rabbit, chicken, and oysters are among the richest sources.

Zinc is of value in insulin therapy. It has been shown that the addition of a protamine, prepared from fish roe, to insulin gives a substance which is less soluble in the body fluids than insulin and therefore has a more prolonged action. The addition of very small amounts of zinc still further prolongs the hypoglycæmic action of the insulin, and protamine zinc insulin is now widely used for the treatment of diabetes (see p. 772).

Manganese occurs in all human tissues, the highest concentrations being found in the liver and pancreas, and in the hair. In small quantities it appears to be an essential dietary constituent, but in large amounts it may be toxic. From experimental work on animals, it appears to affect growth rate, skeletal metabolism, ovulation, and development of the fœtus. The minimum daily requirement of manganese is not known, but there is no reason to suppose that manganese deficiency ever occurs in human beings. The richest sources are tea, whole cereals, nuts, pulses, and green leaves. The amount of manganese derived from tea varies with the kind of tea, the strength of the infusion, and the amount drunk, but many people probably get more manganese from their tea than from anything else.

Cobalt has been shown to be essential in the nutrition of domestic animals. In various parts of the world—Australia, New Zealand, Florida, Kenya, and Scotland—cattle and sheep suffer from a wasting disease known as coast disease, enzootic marasmus, bush sickness, or pine. This is characterised by anæmia, loss of weight, lethargy, abortion, and inability to lactate. It is caused by a deficiency of cobalt in the soil and in the pasture, and can be cured by administering cobalt to the affected animals.

It has long been known that cobalt was in some way connected with the production of the red blood cells, for when given to animals in excess of their normal requirements it produces polycythæmia. It has recently been discovered that the anti-pernicious anæmia factor, vitamin B_{12}, contains cobalt.

Phosphorus. Although a large part of the phosphorus in the body is present in the bones, it exists there in a relatively inert form. It is present in every other tissue of the body, it plays a role in carbohydrate and fat metabolism, and forms an integral part of the nerve sheaths and muscle cells.

Flesh foods of all kinds, milk, eggs, and cheese all contain abundant supplies of phosphorus in a form which is available to the body. Some plant foods are rich in phosphorus, notably whole cereals, nuts, and pulses. About half the phosphorus in these foods, however, is present as part of the organic complex, phytic acid, which is not broken down by the digestive enzymes, and tends to pass through the intestine without being absorbed. None the less, the supply of phosphorus in an ordinary mixed diet is usually ample. Some table salts contain small amounts of calcium and magnesium phosphates.

Sulphur is derived mainly from two amino-acids, cystine and methionine, and diets adequate in protein will be adequate in sulphur. The sulphur-containing amino-acids are needed for the formation of many of the body proteins, particularly the hair, the nails, and some of the enzymes.

Arsenic and some of the war gases owe their poisonous properties to their capacity for combining with the sulphur-groups in these enzymes and so destroying their activity. Cystine, as the active fraction of the glutathione molecule, plays a part in some of the oxidations which the cells of the body carry out, and it forms a part of the acids contained in the bile.

Most of the sulphur in the food is converted to sulphates and excreted as such by the kidney.

Iodine is needed for the formation of thyroxin, the active principle of the thyroid gland, which governs the rate at which food is burned in the body, and which is a controlling factor in the growth and changes of the body from infancy to adult life. A deficiency of iodine, which occurs in inland regions such as Switzerland and the central parts of the United States, and to a lesser extent in some districts in Great Britain, may lead to simple goitre amongst girls at puberty, and this may recur during pregnancy. Iodine taken in minute quantities cures this condition in the mother if given in time, and prevents her children from being born cretins, with arrested mental and physical growth and development.

The chief sources of iodine are probably the sea, the soil, and the drinking water, though the soil and water vary very much in the amount they contain. Vegetables, especially those grown near the sea, and all fish and seaweeds, contain iodine. In March, 1950, it was decided in Parliament that all table salt sold in Britain should have iodine added to it in amounts between 15 and 30 parts per million, but it was stated that it would be two years or more before all the salt could be so treated.

The actual amount of iodine required is very, very minute: 1/20,000 gram a day or 1/50 gram a year is quite sufficient for the adult. Children need rather more, especially at puberty and other periods of rapid growth, and should probably receive about 1/6,000 gram a day.

Fluorine has attracted much attention in recent years, since it has been recognised that an excess, even in extremely small amounts, in the food and water may cause profound changes in the structure of the bones and teeth. An affection of the teeth of children, " mottled enamel," has been known for many years, and this has been shown to occur in districts where the drinking water contains more than 1 part per million of fluorine. It is characterised by opaque white patches or bands irregularly distributed over the tooth. These may or may not become pitted or stained a brown colour. There is some evidence that an excess of fluorine in the drinking water may also sometimes be responsible for the development of malformation of the spine. In animals excess fluorine certainly leads to serious enlargement and malformation of the bones, and cattle and sheep that are kept on pastures near brickworks and other factories where fluorine is given off in the flue gases become lame.

Traces of fluorine in the drinking water appear to be beneficial, however, and a concentration of 0·3 to 0·5 parts per million renders the teeth resistant to dental caries, without producing mottling.

VITAMINS

One of the most interesting features in the advance of the science of nutrition during the last forty years has been the discovery of a number of previously unknown food constituents which exercise a powerful influence on health. It has been established that there are a number of disorders known as " deficiency diseases " which are caused, not by the presence of germs, but by the absence of some constituent from the food. Experiments have shown that these deficiency diseases can be produced or prevented at will in animals by withholding certain nutriments from them or by including them in the diet. Serious deficiency diseases in this country are rare to-day, though at one time rickets was so common that it was known as " the English disease."

In the Orient and in southern parts of Europe and North America, deficiency diseases are still a scourge.

Some people appear to regard vitamin-deficiency diseases even in this country as a subject demanding serious attention. Cases of night-blindness have been reported, and rare cases of pellagra have been discovered. Every year 0·17 per cent. of our population suffers from diphtheria and 0·16 per cent. develop tuberculosis. Even if 100 cases of night-blindness per annum do occur, this is affecting only 0·00025 per cent. of the population, an almost insignificant proportion when compared with the figures quoted above for the incidence of two diseases which are just as serious. The danger of vitamin-deficiency diseases in this country appears to have been rather over-emphasised.

In 1912 Sir F. G. Hopkins published the results of some classical feeding experiments on rats, which he had made six years earlier. He had fed the animals on purified preparations of protein, fat, carbohydrate, and salt mixture in the right proportions, but they did not grow. If a small quantity of milk or fresh tissue was added to the diet the rats developed in the normal way. He suggested that there was a vital something which was present in fresh foods, and which was absent from his purified preparations of protein, fat, and carbohydrate. He did not know whether one or more substances were supplied in the fresh food, nor had he any idea of their chemical nature, so he spoke of them as "accessory food factors." Hopkins' work was really a continuation of that of a number of earlier investigators, but he was one of the first to bring conviction to his fellow-scientists.

These substances, which were found to be several in number, were given the name "vitamines" in 1912. So little was known about them that the problem of naming them was a difficult one. They had no popular names, so they were merely given letters of the alphabet—A, B, and C—and were renamed "vitamins" soon afterwards. Later it was found

that what was originally thought to be one substance, vitamin A, was really two, and vitamin D was separated from it. Similarly, vitamin B has proved to consist of a number of different substances, and the existence of two other factors, vitamins E and K, has since been discovered.

Our whole conception of vitamins has undergone a profound change since 1912. At first most people thought of them merely as substances responsible in minute amounts for the growth and health of men and animals, and this idea was enhanced by finding that well-known diseases such as rickets and scurvy could be cured by adding them to the diets. The separation into fat-soluble and water-soluble vitamins, and the further subdivision of these main groupings were milestones in the march of progress. The recognition that some of the B vitamins formed part of the enzyme systems of the cells was a great advance, and so was the realisation that only very few animals required to be supplied with vitamin C in their food. All made use of it in their metabolic processes, but most could synthesise it for themselves. This appreciation that every organism might have different "vitamin" requirements was a great step forward, and with the development of chemotherapy and microbiology the growth factors necessary for bacteria began to be studied as intensively as those of man. "Anti-vitamins" began to be recognised, and the subject has now become so specialised and complicated that it is impossible to give more than a brief outline of it here. Few organisms (other than the green plants) can synthesise all the organic compounds they require for their growth and maintenance. They generally fail over a few, which may be amino-acids, compounds for the co-enzyme systems, or carbohydrate derivatives. These failures have no doubt played a large part in determining the organism's general food habits and its place in nature. A further refinement in the study of the requirements of vitamin-like substances has been the search for and recent isolation of vitamin B_{12}, the factor

responsible for the cure of pernicious anæmia. Here the deficiency develops in certain individuals because they lose the property they hitherto possessed of freeing this compound from its combination in the food or of absorbing it.

One other series of discoveries has had a profound effect upon our conception of vitamins and other essential substances. This is the realisation of the role of the intestinal flora in making substances required by the parent host. In ruminants this is all-important, and even in man some of the B vitamins and vitamin A may be derived from this source.

Vitamin A. This is a fat-soluble vitamin and is derived from animal fats, liver, butter, cream, milk, egg yolk, and fat fish, such as the herring. Liver is by far the richest source in ordinary diets, and fish liver oils and concentrates prepared from them are the most important medicinal preparations. The livers of polar bears and seals contain such large amounts of vitamin A that they cause symptoms of vitamin A intoxication if they are eaten. The Eskimos avoid these livers, presumably because they have discovered their harmful effects.

There are two ways in which vitamin A is normally obtained. One is by eating animal fats with vitamin A in them. The other is by eating fruits and vegetables which contain a red or yellow pigment called carotene. This is present in all yellow fruits and vegetables, notably in carrots, swedes, tomatoes, green-leaf vegetables, and in peaches, apricots, and oranges. In leaves it is generally found associated with chlorophyll—the outer green leaves of a cabbage are a good source of carotene, while the inner white leaves of the heart contain none. Carotene in green grass is the origin of the vitamin A in milk, butter, and cream. Summer milk contains more vitamin A than winter milk because the cows are out at pasture during the summer months.

Carotene was isolated and shown to be a complex hydrocarbon many years before its connection with vitamin A was suspected. The conversion of carotene to vitamin A probably

occurs in the small intestine, but β-carotene has a much lower activity than preformed vitamin A. The vitamin is transported by the lymphatic system and stored in the liver.

Vitamin A is essential for vision in dim light, and a person's power of dark adaptation has often been used as a means of determining whether or not he is deficient in vitamin A. Just behind the retina of the eye is a layer of cells, which manufacture a pigment called "visual purple" containing vitamin A. This pigment sensitises the "rods" of the retina, which are used for vision in a dim light. Visual purple is bleached or destroyed by bright light, but it is quickly regenerated if there is no shortage of vitamin A.

An important function of vitamin A, particularly in animals, appears to be its action on all epithelial tissues. If the body is deprived of vitamin A the normal epithelium degenerates and becomes keratinised, and more susceptible to infection. Hence vitamin A has sometimes been called the "anti-infective" vitamin. Vitamin A is also in some way responsible for regulating the activities of bone cells. Lack of vitamin A causes an overgrowth and increase in thickness of the bones of the skull and spinal column, so that the brain and the nerves entering or leaving it are compressed and damaged. Young dogs deprived of vitamin A become deaf for this reason.

The minimum requirement of vitamin A is still uncertain. The needs seem to depend on the weight of the body rather than on age or physical activity. An allowance of 50 I.U. per kilogram body weight, or 3,000 I.U. for an adult is probably amply sufficient if the supply comes entirely from vitamin A itself. In pregnancy and lactation the requirement is higher.

Vitamin D. The best-known disease due to a vitamin-deficient diet is rickets, which was at one time very common in this country, before the reason for its occurrence was understood. Vitamin D is one of the major factors in controlling the absorption of calcium and phosphorus from the intestine, and it is probable that it also has a direct influence

on the process of calcification of bones and teeth. Hard bones cannot be formed unless the minerals that make them, calcium and phosphorus, are contained in the food in sufficient quantity, but even if calcium and phosphorus are present in adequate amounts they cannot be utilised if there is a deficiency of vitamin D.

The bony changes which are characteristic of rickets are craniotabes, a large square-shaped head, late closure of the fontanelle, beading of the ribs or "rickety rosary," deformity of the chest, bending of the long bones under the weight of the body when the child begins to crawl and walk, enlargement of the epiphyses and fractures. Rickets is primarily a disease of young children, but it is not confined to them. Osteomalacia or adult rickets, though practically unknown in this country, is quite common in India and China among women who have had repeated pregnancies and who have lived on a diet containing little or no vitamin D. The bones become decalcified and collapse, and the pelvis may become so distorted that normal delivery is impossible. Rickets occasionally occurs in older children or adults who have, for some unknown reason, become resistant to vitamin D. Their bones show all the characteristic rachitic changes, and they can be cured by massive doses of vitamin D. Rickets is sometimes seen as a complication of cœliac disease, because the inability to absorb fats means that the absorption of the vitamin D in the fats is also reduced.

Vitamin D is fat-soluble. It is rarely present in plants but is widespread in animal foods. The only rich sources, however, are mammalian liver and the fat of fish, particularly the fish liver oils. The richest known natural source is tunny liver oil, which may contain 40,000 I.U. per gram as compared with 1,200 for halibut liver oil and 200 for cod liver oil. How the fish get their vitamin D is still an unsolved mystery.

Sunlight had been suspected of playing an important part

in the prevention and cure of rickets long before the nature of its action was understood. Rickets is seldom seen in the tropics, but is prevalent in temperate climates, and there is a distinct seasonal variation in the number of cases—many more appear after the winter than after the summer, and most of them improve in the summer sunshine. In India and other tropical eastern countries rickets and osteomalacia are common as a result of the purdah system, whereby women and children are confined indoors. It was proved in 1921 that rickets could be cured by exposure to sunlight, and that the curative effect was due to the ultra-violet rays. The ultra-violet rays act upon a substance called 7-dehydrocholesterol which is present in the fat on the surface of the skin, and convert it to vitamin D. The action of light corrects the effects of a diet inadequate in vitamin D, but only if the defects are not too severe or too prolonged.

In 1932 a pure substance, calciferol, having great vitamin D activity, was synthesised by the irradiation of ergosterol, a plant sterol found in fungi and in yeasts. It was thought at first that calciferol was identical with true vitamin D, but it was found that the vitamin D in cod liver oil was far more active than calciferol in curing rickets in chickens. Hence it was concluded that there were at least two different forms of vitamin D. The naturally occurring vitamin is called D_3, and calciferol D_2. As far as is known the two vitamins are equally effective for human beings.

The amount of vitamin D in breast milk partly depends upon the vitamin D intake of the mother, and many pædiatricians consider that all babies, whether breast-fed or not, should be given two or three small teaspoonfuls of cod liver oil a day, providing about 500 I.U. of vitamin D. Children need vitamin D throughout the growth period, and 400 units a day are generally recommended. It is doubtful whether adults need much vitamin D, except during pregnancy and lactation, when 400 units a day are desirable.

Vitamin C, or ascorbic acid. Long before the age of

vitamins it was realised that scurvy was caused by the lack of something in the diet, something that was found in fresh fruit and vegetables, which disappeared if the food became stale or dry. Scurvy was very prevalent in the sixteenth century, especially among sailors at sea for long periods, who lived on salt meat and a biscuit made of flour and water and known as "hard tack." Any kind of fresh fruit or vegetables was unheard of on board. First the crew became weaker, less able to make any efforts, easily out of breath, and readily depressed. Sunken eyes, constant pain in the muscles, mental and physical exhaustion, bleeding from the gums, eyes, and nose were symptoms which gradually became worse and worse, and the men frequently died of the disease. Infantile scurvy, or "Barlow's disease," was common in this country at the beginning of the present century, when artificially fed babies were fed on sterilised foods, with no fresh milk or fruit juice.

To-day scurvy is almost a thing of the past. It still may occur where groups of people are isolated for a considerable period of time, as during a siege, or on Arctic or Antarctic exploration, but with our present knowledge and the availability of the synthetic vitamin, it should never be seen again. It is characterised by hæmorrhages in different parts of the body, especially under the periosteum of the bones and in the mucous membranes and gums. Changes take place in the bones and teeth. The teeth become loose, and previously calcified dentine becomes porous. Bone formation ceases and the bones become rarefied.

Vitamin C appears to be essential for the formation of the inter-cellular substance and collagen-fibres, and wound healing is delayed if there is a deficiency of vitamin C.

Many animals can synthesise ascorbic acid for themselves, but man, monkeys, and guinea pigs cannot, and they depend upon their food for their supply. Vitamin C is found in plant foods, but vegetables and fruit vary very much in the amounts they contain. The best sources are black currants,

strawberries, lemons, oranges, grapefruit, tomatoes, and most green vegetables. On the other hand, grapes contain almost no ascorbic acid, and some varieties of apple are very poor sources. Potatoes contain much more of the vitamin when they are freshly dug than after they have been stored for some months, and it is an interesting fact that a potato famine in Ireland has been more than once followed by an outbreak of scurvy. It is certain that a large proportion of our population depends almost entirely upon potatoes for its supply of vitamin C.

Ascorbic acid is gradually destroyed by cooking, but a far more serious cause of loss is the solubility of the vitamin in the cooking water. When vegetables are boiled, half to two-thirds of their vitamin C may dissolve out and be thrown away. In the case of stewed and canned fruit the juice is usually eaten, so this cause of loss need not be considered. There is no appreciable loss of vitamin C in fruits or vegetables kept in cold storage or treated by the " quick-freeze " process.

Human milk normally contains from four to five times as much vitamin C as cow's milk. Pasteurisation of milk results in a destruction of about half of its vitamin C, whilst sterilisation destroys this vitamin completely.

The chemical constitution of ascorbic acid is now well known. Not only has it been isolated from plants, but it has been synthesised in the laboratory. It has a relatively simple chemical structure and is allied to the sugars.

There is wide divergence of opinion about the requirement for vitamin C. This is because there is a big difference between the amount required to prevent scurvy and that needed to " saturate " the body. Some authorities consider that the body in some way benefits by being permanently " saturated " with the vitamin, and American figures for adult requirements are generally of the order of 75 mg. a day. British workers tend to favour a lower figure of 30 mg. a day. There is no doubt that a large proportion of the population of this country rarely achieve the higher value.

Vitamin B_1, aneurin, or thiamine. This substance was first isolated from rice bran and yeast, and in 1936 it was synthesised and its structure determined. It is the fraction of the B-complex which prevents and cures beri-beri, and its history is closely associated with that of beri-beri. It is present in the bran and husks of cereals, and beri-beri started with the introduction of polished rice in the East in the nineteenth century. The richest sources of aneurin are whole cereals, yeast and yeast extracts, pork and pulses, but it is present in all fruits and vegetables in small amounts. It is water-soluble, and will therefore tend to dissolve out during cooking.

When a person who has been deprived of aneurin is given glucose, abnormally high concentrations of pyruvate and lactate are found in his blood. This is because aneurin, or its pyrophosphoric ester called cocarboxylase is essential for one stage of carbohydrate metabolism, the utilisation of pyruvic and related acids in normal respiratory processes.

The aneurin requirement is thought to be related to the intake of Calories from foods other than fats. About 1·5 to 2 mg. a day are probably sufficient for an adult, and children need correspondingly less.

Vitamin B_2, riboflavin. This vitamin was first separated from other members of the B-complex in 1935 and its chemical structure established. It has been shown to be a constituent of a number of enzyme systems, particularly those concerned with oxidation—reduction reactions in the cells.

Uncomplicated riboflavin deficiency is rarely seen in man, but occurs more frequently in association with deficiencies of other B-vitamins. The lesions are conjunctivitis and vascularisation of the cornea. Ultimately the development of corneal opacities may lead to partial blindness. There are also skin changes, including a magenta-coloured tongue, and desquamation of the epithelium of the lips (cheilosis), with fissuring at the angles of the mouth (angular stomatitis).

The richest sources of riboflavin are yeast, liver, milk, whole cereals, and eggs. The daily adult requirement is thought to be 1·5–2·0 mg. a day.

Nicotinic acid and nicotinamide. Pellagra was recognised as a deficiency disease, particularly of maize eating communities, long before the nature of the vitamin was discovered. In 1937, experiments on dogs, pigs, and monkeys showed that the pellagra-preventing factor was nicotinic acid. This is a well-known and relatively simple chemical compound, β-pyridine carboxylic acid. The acid amide, nicotinamide, has a similar activity. The body can synthesise nicotinic acid from tryptophane, and it is the absence of this amino-acid from maize which makes those who live on it so liable to pellagra.

Nicotinic acid forms part of complex enzyme systems concerned with hydrogen transport in the living cell. Most protein foods contain nicotinic acid. Yeast, salmon, and some liver extracts are particularly rich sources, and also whole cereals. The nicotinic acid is present in these foods mainly in the form of coenzymes. An adult's requirement of nicotinic acid is thought to be about 10–20 mg. a day.

Vitamin B_6, pyridoxine. Pyridoxine has been shown to be essential for the rat, pig, dog, and chicken, but there is as yet no certain proof that it is of any importance in human metabolism.

Pantothenic acid. This again is necessary for normal health in rats, dogs, and chicks, but there is no evidence that it is required by man.

Vitamin B_8, or adenylic acid. Adenylic acid or adenosine monophosphate, is widely distributed in nature, particularly in cereals, yeast, and glandular tissues. It forms part of the enzyme system concerned in catalysing oxidation–reduction mechanisms in cells. It seems to enhance the value of other members of the B-complex when given medicinally, but there is no evidence that it is essential to human nutrition.

Vitamin B_{12}. This is a substance which has recently been

isolated from liver and from streptomycin residues, which has a powerful action in promoting blood regeneration in pernicious anæmia. It contains cobalt, but its exact chemical structure is still unknown. It is undoubtedly the most potent anti-anæmic substance known and doses of two or three millionths of a gram a day are sufficient for satisfactory erythropoiesis. Its action differs from that of folic acid in that vitamin B_{12} appears to have a beneficial effect on the neurological complications of pernicious anæmia, while folic acid has none.

Folic acid. Folic acid or pteroyl-glutamic acid is of importance for normal blood formation in birds and animals, and it is undoubtedly of value therapeutically in the treatment of macrocytic anæmias in humans. The exact mechanism of its action is as yet unknown.

Inositol. Inositol is present in all animal and plant tissues in quite large amounts, and the daily intake is about 1 gram, which is greater than that of any other vitamin. It appears to prevent the deposition of fat in the liver, but its exact function in human nutrition is unknown.

Choline. Choline prevents the deposition of excess fat in the liver of rats fed on a diet rich in fat, and prevents cirrhosis in experimental animals. It has been suggested that it may have a similar function in humans, but this has not yet been proved.

Biotin. Biotin was discovered through the substance which antagonises it, avidin. It was noticed that when raw egg white was included in the diet of rats, they developed a dermatitis and this was later demonstrated to be because a constituent of raw egg white, avidin, combines with an essential substance, biotin, and renders it unavailable. Signs of biotin deficiency have also been reported in a man who derived 30 per cent. of his Calories from raw eggs, but this deficiency cannot be a very serious practical menace.

Vitamin E. Vitamin E is an essential constituent of the diet of rats. If it is deficient, an abnormal pigment, ceroid,

appears in the muscles, resorption of the fœtus occurs during pregnancy in the female, and in the male degeneration of the germ cells takes place. Whether or not vitamin E deficiency in humans has any connection with habitual abortion has not been satisfactorily proved, though there is some evidence that treatment with vitamin E concentrates may be beneficial in certain cases. It has been suggested that vitamin E may be beneficial in progressive muscular dystrophy, but clinical trials with it have been disappointing.

The best sources of vitamin E are wheat germ and green leaf vegetables, particularly lettuce. In 1936 the vitamin was isolated in crystalline form and was given the name α-tocopherol.

Vitamin K. Vitamin K, which is a fat-soluble vitamin with a quinone structure, is essential for the formation of prothrombin which, in its turn, is essential for the coagulation of the blood. Infants just after birth may be deficient in prothrombin, and hæmorrhagic disease of the newborn may be prevented by administering natural vitamin K or a simple synthetic analogue. Vitamin K is beneficial in hæmorrhage associated with liver damage, but it has no effect on some kinds of bleeding, *e.g.* hæmophilia, because these are not due to a deficiency of prothrombin.

Green plants are the richest sources of the various compounds with a vitamin K action, and the vitamin is produced in the large intestine by bacteria. Whether the amount synthesised is enough for a normal man's requirements is not known. Deficiencies produced by inadequate diets have been reported, but faulty absorption from the intestine is a more common cause, particularly when the bile duct is obstructed so that the bile salts do not reach the intestine.

"CONDITIONED" DEFICIENCIES

Before food can be utilised by the body it must be eaten, digested, absorbed, and metabolised. Deficiency diseases

may arise if there is a failure in any one of these processes. In the ordinary sense of the term, a deficiency disease implies that there is an inadequate intake of some particular essential dietary constituent. The term "conditioned" deficiency is used to describe a deficiency which is caused, not by inadequate intake, but by failure of the digestive, absorptive, or metabolic processes.

Disorders of the gastro-intestinal tract are the most common cause of "conditioned" deficiencies. If there is mechanical obstruction, due to pyloric stenosis, or intractable vomiting for some other reason, *e.g.* vomiting of pregnancy, there may be a state of general malnutrition. Chronic diarrhœa may have the same effect. Sometimes the absorptive failure is more limited, and may even be confined to a single dietary constituent. Thus, the absorption of fats is particularly interfered with in cœliac disease and tubercular peritonitis. Vitamin deficiencies may arise in a similar way. Further, a vicious circle may be set up, for minor deficiencies may cause mild disorders of the gastro-intestinal tract, and these in turn may intensify the defective assimilation.

"Conditioned" deficiencies may also arise as a result of treatment by drugs. Sulphonamides, for example, interfere with the normal synthesis of vitamin K in the intestine, and may lead to a deficiency of this vitamin, and mineral oils interfere with the absorption of vitamins A and D.

There is evidence that aneurin, riboflavin, and nicotinic acid are also synthesised by bacteria in the human gut, and that this synthesis is also prevented by sulphonamides, sulphaguanidine, and allied drugs. Whether clinical signs of deficiencies appear will depend on how much the person was depending on his intestinal bacteria for his B vitamins and on how long the drug treatment is continued.

Finally, the untreated diabetic may be regarded as carbohydrate-deficient due to a metabolic failure. Diabetes, however, is not usually included among "conditioned" deficiencies.

	Protein	Fat	Carbo-hydrate	Calcium	Phosphorus
MEAT					
	Liver *	Liver	—	—	Liver *
	Kidney *	—	—	—	Kidney
	Lean meat *	—	—	—	Lean meat
	—	Fat of meat *	—	—	—
	Heart *	Heart	—	—	Heart
	Bacon	Bacon	—	—	Bacon
	Chicken *	—	—	—	Chicken
	Rabbit *	—	—	—	Rabbit
	Sweetbread *	—	—	—	Sweetbread*
FISH					
	All fish *	Fat fish, *e.g.* herring	—	—	All fish *
	Fish roe *	Fish roe	—	—	Fish roe *
	Sprats	Sprats	—	Sprats	Sprats
	Sardines	Sardines	—	Sardines	Sardines
	—	Fish liver oils *	—	—	—
DAIRY FOODS					
	Whole milk	Milk	Milk	Milk	Milk
	Eggs	Eggs	—	Eggs	Eggs
	Cheese *	Cheese	—	Cheese *	Cheese
	Skimmed milk *	—	—	—	—
	—	Butter *	—	—	—
	—	Cream *	—	—	—
CEREALS					
	Soya flour	Full fat soya flour	—	Soya flour	—
	—	—	All cereals *	—	Whole cereals
	—	—	Bread and flour *	—	Wholemeal or "brown" bread and flour
	—	—	Oatmeal *	—	Oatmeal
	—	—	Rice, tapioca, etc.*	—	—
	—	Cakes and biscuits	Cakes and biscuits *	—	—
NUTS					
	Almonds and peanuts	All nuts except chest-nuts	Chest-nuts *	Almonds, Barcelona nuts, and Brazil nuts	All nuts except chestnuts and coco-nuts

* *Indicates a very rich source*

VARIOUS FOOD ESSENTIALS

Iron	Vitamin A	Vitamin B Complex	Vitamin C	Vitamin D
Liver *	Liver *	Liver *	—	Liver *
Kidney	Kidney	Kidney *	—	—
Lean meat	—	Lean meat *	—	—
—	Fat of meat (not pork)	Pork *	—	—
Heart	Heart	—	—	—
Bacon	—	—	—	—
Chicken	—	Chicken	—	—
Rabbit	—	Rabbit	—	—
—	Sweetbread	Sweetbread	—	—
—	Fat fish, * *e.g.* herring	All fish	—	Fat fish, * *e.g.* herring
—	Fish roe *	" Hard roe " *	—	Fish roe *
				Tinned salmon
Sprats	Sprats	Sprats	—	Sprats
Sardines	Sardines	Sardines	—	Sardines
—	Fish liver oils *	—	—	Fish liver oils *
—	Milk	Milk	Milk (raw)	Milk
Eggs	Eggs *	Eggs	—	Eggs
—	Cheese	—	—	Cheese
—	—	—	—	—
—	Butter	—	—	Butter
—	Cream	—	—	Cream
Soya flour	—	—	—	—
—	—	Whole cereals *	—	—
Wholemeal or " brown " bread and flour	—	Wholemeal * or " brown " bread and flour	—	—
Oatmeal	—	Oatmeal *	—	—
—	—	—	—	—
—	—	—	—	—
—	—	Nuts *	—	—

Protein	Fat	Carbohydrate	Calcium	Phosphorus
FRUIT				
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	Bananas	—	—
—	—	Sweet fruits, *e.g.* grapes, pineapple, plums	—	—
—	—	Dried fruit *	—	—
—	Olives	—	—	—
VEGETABLES	—	—	Green leaves, *e.g.* spinach, watercress, outer leaves of cabbage and lettuce	—
Peas and beans	—	Peas and beans	—	Peas and beans
—	—	Root vegetables	—	—
—	—	Potatoes	—	—
OTHER FOODS				
—	Chocolate	Chocolate	—	Chocolate
—	—	—	—	Cocoa
—	—	Black treacle *	—	—
—	—	Golden syrup *	—	—
—	—	Sugar *	—	—
—	—	Jam *	—	—
—	—	Marmalade *	—	—
—	—	Honey *	—	—
—	Margarine *	—	—	—
—	Lard *	—	—	—
—	Dripping *	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—

* *Indicates a very rich source.*

VARIOUS FOOD ESSENTIALS—*cont.*

Iron	Vitamin A	Vitamin B Complex	Vitamin C	Vitamin D
—	Tomatoes *	Tomatoes	Black-currants *	—
—	Oranges	Oranges	Oranges *	—
—	—	—	Lemons * and grape-fruit *	—
—	—	—	Straw-berries *	—
—	—	—	Raspberries and black-berries	—
Dried apricots and peaches	Dried apricots and peaches	Apricots and peaches	Apricots and peaches	—
—	—	—	—	—
Green leaves, *e.g.* spinach, watercress, outer leaves of cabbage and lettuce	Green leaves,* *e.g.* spinach, watercress, outer leaves of cabbage and lettuce	Green leaves	Green leaves (raw),* *e.g.* watercress Green leaves (cooked)	—
Peas and beans	Peas	Peas and beans *	Fresh peas	—
—	Carrots *	Root vege-tables	Root vege-tables	—
—	—	Potatoes	Potatoes	—
Chocolate	—	—	—	—
Cocoa	—	—	—	—
Black treacle	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	Yeast *	—	—
—	—	Autolysed yeast ex-tracts *	—	—
—	—		—	—
—	—		—	—

CHAPTER III

THE NORMAL DIET (cont.)

3. Dietary Requirements in Pregnancy, Lactation, and Old Age

PREGNANCY

During the last three months of pregnancy the human fœtus puts on two-thirds of its total birth weight and of its calcium and phosphorus, three-quarters of its protein, four-fifths of its iron, and almost the whole of its fat. Special attention must therefore be paid to the quality and quantity of the diets of expectant mothers at this time. The fœtus moreover, accounts for only about one-third of the mother's gain in weight during pregnancy, and while part of this gain is due to water, a pregnant woman normally retains far more nitrogen and other substances than is required for her baby at birth. This is a physiological process and is presumably a storage of material for subsequent use during lactation.

During the first four months of pregnancy there is no need to increase the calorie value of the diet. The chief requirement in early pregnancy is a diet which will prevent the nausea and vomiting of "morning sickness." Expectant mothers who suffer from this should take a liberal supply of easily digested carbohydrate at bedtime in the form of barley sugar, lemonade with plenty of sugar or glucose, or rusks, biscuits, or bread and jam, but no butter. Excess of fat in the diet should be avoided, but adequate amounts of vitamins A and D should be secured.

Most authorities are agreed that greatly increased amounts of protein or of total food are unnecessary during pregnancy, although the League of Nations Committee, 1936, proposed

that the protein intake should be increased to 1·5 g. per kg./day during the last five months and similar recommendations were made by the National Research Council (p. 312).

A woman's ability to absorb calcium appears to be increased during pregnancy; she retains about twice as much as is required for her baby at birth, the remainder probably forming a reserve in her own bones for subsequent needs during lactation. Most authorities recommend a calcium intake of 1·5 g. a day in the latter part of pregnancy.

The iron requirement is also increased during pregnancy, but a fall in the hæmoglobin concentration of the mother's blood occurs even if she is receiving sufficient iron in her food, because her blood volume increases by at least 20 per cent. Iron-deficiency anæmia does tend to occur, however, particularly if the woman was anæmic before her pregnancy began, and a daily intake of 15 or 20 mg. of iron a day is highly desirable.

The National Research Council recommended that a pregnant woman should have 6,000 I.U. of vitamin A a day and 400 I.U. of vitamin D. When rationing was introduced at the beginning of the recent war, expectant mothers were allowed extra milk, meat, and eggs, and also orange juice and cod-liver oil or tablets containing vitamins A and D. This supplement of vitamin D amounted to 800 I.U. a day.

LACTATION

During lactation the food demands of the mother are greatly increased, for the entire nutrition of the child depends upon her. If her diet is deficient, her milk may be normal in composition but the amount will be too small for the needs of her baby. Her diet must be adequate in Calories, but some lactating women tend to put on weight, and the calorific value of the diet may need to be controlled to prevent obesity. Sometimes a high calorie diet is

required if the mother is to maintain her body weight. Each case must be considered individually. It is absolutely essential that the nursing mother should obtain ample supplies of calcium, protein, vitamins A, D, and C, and water. To secure these, the following foods are of special value—milk, cheese, eggs, liver, fruit, and vegetables. At least a pint of milk should be taken daily in some form. Most authorities recommend the use of halibut or cod-liver oil or some other rich source of vitamin D, and the nursing mother should continue to take the same supplements of cod-liver oil or capsules containing vitamins A and D as she did during pregnancy.

OLD AGE

Special attention should be paid to the diets of older men and women. The activity of elderly persons is often restricted, and it is most important for them to avoid a calorie intake beyond their requirements, for excess fat puts an undue strain on their hearts. Insurance statistics show that old people who maintain the average weight for their height at thirty years live longest. On the other hand, many elderly people restrict their diets unwisely, either through inability to chew food properly or because they eliminate wholesome foods which they believe disagree with them. Generally speaking, old people enjoy their food, and are able to eat ordinary food at the usual mealtimes. Their diets should be as varied as possible but they should be easily digestible, particular care being taken to avoid indigestible foods last thing at night.

CHAPTER IV

HIGH AND LOW CALORIE DIETS

HIGH CALORIE DIETS

Loss in weight is one of the characteristic signs of undernutrition. It may be due to a shortage of food, as in war or famine, or to continued under-eating, or persistent vomiting as in anorexia nervosa. It may also be the result of disease, especially tuberculosis, carcinoma, diabetes, Addison's disease, and Graves' disease.

The object of a high calorie diet is usually to supply as much extra nourishment as possible in a form easy to consume and digest. If the patient has a good appetite this is easy to accomplish. A group of undernourished men in Germany in 1946, for example, whose ages ranged from twenty-five to eighty years, and whose rations had supplied them with insufficient Calories for the past eighteen months, found no difficulty at all in eating a diet composed of ordinary foodstuffs and providing 6,000 Calories a day. On this diet they gained 10 kilograms in body weight in eight weeks.

Often, however, it is necessary to have faith in the saying "l'appétit vient en mangeant," and to increase the food a little each day. There may be some particular food of which the patient is especially fond, and every effort should be made to provide this, so long as there are no contra-indications because of his disease. Each person is a law unto himself as regards his food, and no rules can be laid down which will apply to all cases. The most carefully prepared meal will be of little use to the patient if he vomits most of it when he has eaten it, or if he refuses to eat it altogether. A young Irish stable-boy of eighteen, for example, who was admitted to hospital weighing only 5 stone, persistently

vomited all the invalid diets which were offered him, but he was willing to eat, and able to keep down, as much fried bacon and eggs as he could get.

Generally speaking, the portions should be moderate at first, and the patient should be encouraged rather than compelled to finish up his meals. Where the appetite is poor extra Calories may be supplied in the form of carbohydrate, and glucose, lactose, or increased amounts of ordinary sugar can be added to all sweetened foods and drinks. Jam, honey, or syrup, in addition to butter or margarine thickly spread on bread, should be given whenever possible. Drinks of fresh lemonade, containing at least 1 oz. of glucose per glass, or a milky drink with biscuits can be taken between meals and at bedtime. Most people find that sweets or chocolate after meals are a pleasant and easy way to increase their calorie intake. Additional fat, such as butter or margarine, used in cooking vegetables, thick soups, and sauces will also increase the calorie value of a diet. Cream, if available, may also be taken with many beverages and puddings, and if this is not whipped larger amounts can be consumed.

Those who wish to gain in weight should never hurry over their meals. The day's food should be divided into three or four meals of approximately equal calorie value, and patients must not expect to be able to take one meal so large that it will make up for the deficiencies of two or three which are inadequate. Besides the regular meals, high calorie drinks or extras should be taken if possible. Examples of high calorie diets are given on p. 116, together with a list of suitable puddings, savouries, and beverages.

TREATMENT OF OBESITY BY LOW CALORIE DIETS

Insurance companies have found, both from experience and through statistical investigation, that the men and women who live longest are those whose weight remains at

all ages close to the average of adults at thirty (see height and weight tables, p. 320). Under that age people tend to be too thin for optimum health, and as they grow older the majority tend to become too fat. Women at the menopause are particularly liable to put on weight. As people advance in years they usually restrict their physical activities, and they should therefore limit the amount of fattening food which they consume, so as to avoid the "middle-aged spread." This is particularly important for those whose hearts are no longer normal, or whose chest walls and lungs have lost their elasticity, for obesity means that an additional weight has to be carried, which inevitably places an extra strain upon the heart.

On the other hand, too much emphasis cannot be laid upon the harm done through the slimming craze. Slimming, except under medical supervision, should be strongly discouraged. Tables for weight and height, such as those given on p. 320, may be taken as a guide, and provided the health is normal small divergences should not be taken too seriously.

Nevertheless, there are many people for whom reducing diets are essential. Obesity, which involves the deposition of abnormal amounts of fat beneath the skin and around the internal organs, is always due to the amount of food eaten being more than the body requires. The calorie requirements of individuals vary enormously, and one man might get fat on a diet on which another of similar age, size, and occupation would lose weight. If the obesity is due simply and solely to over-eating combined with too little exercise, it will respond at once to dietary treatment and requires no other. If, on the other hand, it is due to some deficiency of the endocrine glands leading to a lowered basal metabolism and a diminished energy requirement, as in myxœdema, it will not respond to diet alone, and is generally treated with thyroid extract.

Patients who require to lose weight must not be expected

to have superhuman powers of self-denial. Only those who have tried to reduce can realise how hard it is to keep away from the temptation of forbidden foods. It is only by continually reminding themselves of the benefits to health and appearance which will result from their abstemiousness that patients will develop the strength of mind required to keep their diet. This must be planned so as to change the routine of the normal meals as little as possible, to give a certain amount of variety, and also a feeling of satiety. A patient who is accustomed to large meals should feel satisfied without any risk of increasing his weight if he takes plenty of bulky, low calorie foods, such as leafy vegetables, fruit, and beverages like tea or coffee with skimmed milk but no sugar, unsugared lemonade, or clear meat or vegetable soups or meat extracts. Great care must be taken to supply a sufficiency of protein, vitamins, and minerals. Periods of starvation, with their unpleasant consequences to health and looks, must be strictly forbidden. The physician may prescribe a drug such as " Dexedrine," which inhibits the desire for food, but the principles of dietary treatment are exactly the same, whether or not such a drug is given.

A loss of about 2 lb. a week may be expected on the reducing diets on p. 119 if the obesity is due to over-eating. The patient must understand that if he eats even small amounts of food above the allowance the desired loss will not take place. Should the loss be too rapid at any stage an extra slice or two of bread, or one or two potatoes, may be added to the diet. If it is too slow, and the doctor is satisfied that the patient is really keeping to the diet, a slice of bread may be omitted and butter or jam given up altogether for the time being. If this fails to produce a reduction in weight a patient may, on doctor's orders, take on one or even two days a week a diet providing approximately 400 Calories only. A convenient arrangement on these days is to take four meals, each consisting of two fruits and $\frac{1}{2}$ oz. (two average-sized) unsweetened biscuits. Tea with milk but no

sugar, unsweetened lemonade, soda water, and meat extracts are allowed as desired.

Reducing diets, owing to their low fat content, may be low in vitamin A, and a concentrate containing this vitamin should be prescribed. Because the total amount of food in reducing diets is small the supply of some of the B vitamins may be deficient. They should be added in some concentrated form such as yeast extracts, which can be spread on bread or used in soups or gravies. Wholemeal or National wheatmeal bread is preferable to white bread since it contains more of the B vitamins.

A reducing diet for patients with heart disease is given on p. 121.

REDUCING DIETS FOR CHILDREN

Gross obesity in children is generally due to some kind of glandular disturbance, hypothyroidism, hypopituitarism, or hypertrophy of the suprarenal cortex. Children suffering from these disorders metabolise their food too slowly. The appetite is often quite small, but even so, they are taking too many Calories for their requirements. Treatment in these cases is primarily medical or surgical, and diet alone will not effect a cure. For fat children whose endocrine glands are functioning normally and whose obesity appears to be due to over-eating, a reducing diet should only be prescribed if the fatness is sufficient to cause general comment and to make it difficult for the child to take a normal amount of exercise.

Reducing diets for children should contain less carbohydrate and fat than is normal for their ages. The carbohydrate intake should not be less than 100 grams a day if the child is leading a normal life, but fat can be reduced to any extent that may be necessary. Sufficient body-building materials, vitamins, and minerals must be secured, and therefore 1 pint of skimmed milk and some concentrate containing vitamins A and D should be included in a reducing

diet intended for a child. (See Diet, p. 120.) If fresh skimmed milk cannot be obtained from a dairy, dried skimmed milk can be used, or it can be prepared at home from bottled milk by pouring off the top cream, placing the partially skimmed milk in a bowl, covering it with butter muslin, and allowing it to stand until the rest of the cream has risen. When this has been carefully removed the skimmed milk is ready for use.

It is generally exceedingly difficult for children to keep to a reducing diet, as they usually have normal, healthy appetites, and crave for their ordinary amounts of bread and butter, potatoes, and sweets. They should be weighed weekly and told the results. They will need constant encouragement to persuade them not to exceed their rations, but once they have appreciated the improvement they have made and have accustomed themselves to their new menu they will find it far easier to keep to their diet.

Some physicians consider that reducing diets should never be prescribed for children. There is a serious danger, particularly among adolescent girls, that once they have discovered how to lose weight by eating very little food they will refuse to eat more, even when their weight has reached a normal level. They may then become as severely underweight as they were overweight before, and much more difficult to cure.

CHAPTER V

INVALID DIETS

THE essentials of human nutrition have been discussed in Chapters I and II. When people are ill they require these food essentials just as much as, and sometimes more than, when their health is normal. Patients who have suffered from long illnesses frequently lose weight, and this is sometimes due to a loss of body protein as well as of fat. If this cannot be prevented it should be repaired as quickly as possible during convalescence. It is therefore most important to supply patients with enough protein, minerals, and vitamins and sufficient Calories to meet their own particular needs.

DIETS FOR INVALIDS

Milk, eggs, bread and butter, and other cereal foods, fresh fruits or fruit juices (for instance oranges, grapes, or lemons), and some form of sugar form the basis of most invalid diets. Many people think that there is some special magic in glucose. This is not true. Ordinary sugar has exactly the same nutritive value, and is far less expensive. The only advantage that glucose has over ordinary sugar is that it is not so sweet, and if it is necessary to add large amounts of carbohydrate in the form of sugar to a diet, more glucose or lactose can be included without rendering the diet unpalatable. Wherever glucose is suggested in the diets on pp. 116–211 it is for this reason.

It should be noted that milk is a poor source of iron, and if a patient, particularly a woman, is kept for a long time on a diet consisting almost entirely of milk reinforced with carbohydrate she may become anæmic unless some form of iron is administered. Patients suffering from diseases

requiring a high calcium intake, *e.g.* hyperthyroidism, should be given a plentiful supply of this element in their food.

How to choose a menu for invalids. Some patients treat their food more seriously than those who are able to go about their affairs normally. Others take no interest in food whatever. It is essential, therefore, to devote special attention to the flavour and appearance of the food, as well as to its digestibility, and to serve the meals punctually and at regular intervals. Delays and unpunctuality cause irritation and may destroy any desire for food.

There should be as much variety from meal to meal and from day to day as possible. Some patients enjoy the meat and savoury type of food better than sweet dishes, while others prefer the latter. Foods suitable for invalids may be flavoured to suit either taste; for instance, a savoury custard made of egg and milk and flavoured with meat extract may be substituted for a sweet custard, and cream of potato soup is similar in nutritive value to milk pudding.

An adult is not likely to enjoy rice pudding when he is ill if it is the one food above all others that he has loathed since childhood, and it will do little good to force him to eat it. Dislikes, however, are sometimes due to prejudice, and wholesome food may be persistently refused for no other reason. If it is an important vehicle of nourishment, *e.g.* milk, the food should be disguised in flavour and appearance so that the patient is tempted to take it.

Dainty service is important for patients whose appetite is poor. Small portions tempt them gradually to second helpings, whereas a larger serving might spoil the appetite. For those with good appetites, on the other hand, it will only be annoying to be given tiny portions, and it must be the business of nurse, dietitian, or cook to serve whatever portion is suitable for the individual patient.

The colour of the food may be important in stimulating the flow of digestive juices, and therefore of improving digestion. If there are several courses, each should be of a different

colour to avoid monotony. For instance, if a patient is only allowed white fish, milk dishes, and fruit juices, a menu could be made up of strained tomato soup, fish with white sauce, with a sprig of parsley for decoration, followed by chocolate blancmange.

The digestion of starchy foods is begun when they are mixed with saliva in the mouth; hence the importance of good mastication. Provided a patient has teeth that are in good condition, hard foods such as rusks, biscuits, and cold buttered toast will be better digested than soft fresh bread, cake, or hot buttered toast, which need little chewing before they are swallowed.

Diets for sick children. Children are prone to minor upsets of short duration, with loss of appetite. These are no cause for alarm, and the child should not be forced to eat, as twenty-four hours without food will do him no harm. Plenty of fluids, particularly fruit juices containing added sugar or glucose, will probably be acceptable.

In constructing diets for children suffering from illness of longer duration it is especially necessary to consider the likes and dislikes of the child. The average child objects to strong flavours. He is conservative about his food, and dislikes changes. New flavours and new kinds of foods should be introduced slowly, together with some other food with which he is familiar. Most children love brightly coloured foods and they can often be tempted with small individual dishes suitably coloured or decorated with sweets such as " hundreds and thousands," or by biscuits cut out in animal shapes. Texture of food is important; for instance, milk puddings should not be stodgy, green leaf vegetables should be tender, chopped finely, and served with gravy to facilitate swallowing. For young children meat should be lightly cooked and finely minced. For the older child it should be cut into pieces he can easily chew and swallow.

Diets for patients receiving radio-therapy. These patients often feel very unwell, and their appetites are extremely

poor. They should be tempted with the foods they like best, and the principles which have just been outlined apply to their dietary treatment. Their meals should be as concentrated as possible, and the light easily digested diet on p. 125, with the addition of sugar, glucose, and fortified milk mixtures, would be suitable. If they are unable to take solid food, the semi-solid diet on p. 130 or the fluid diet on p. 131 may be given.

DIET IN FEVER

Fluid diets. Patients with fever cannot usually take more than 6 to 8 oz. of food at a time, especially if they are fed two-hourly, and it is generally a mistake to press them to have more. During the night they should not be awakened to be given food, but should be fed when they wake. This prevents unnecessary restlessness, which saps their energy, and serves no useful purpose.

Feverish patients should take at least 3,000 c.c. (5 pints) of fluid during the twenty-four hours. Each drink should, as far as possible, be made a vehicle for Calories, protein, vitamins, and minerals. For this reason meat juice and extracts, beef tea, and clear soup should be avoided, as they have very little food value and are chiefly useful owing to the pleasant flavour which they can impart to food or as a stimulant of appetite for foods containing nourishment. For fluid diets suitable for feverish patients, see p. 131.

If a patient has an ulcerated sore throat, as in scarlet fever, lemon and other acid fruit juices must be avoided.

The use of alcohol in fever. Alcohol is nowadays seldom used in fever, though most physicians still recognise it to be of great benefit in certain cases. Its real value is as a narcotic and not as a stimulant. It allays anxiety and distress and promotes rest and sleep.

It is generally recognised that those who habitually take alcohol in moderate or large amounts should be allowed to continue to have it, provided its use is not definitely

contra-indicated. Heavy drinkers generally fare better if their diet allows moderate amounts of alcohol.

Care of the mouth. During fever, distaste for food is often increased by the condition of the mouth, the furred tongue making all food unpalatable. If this is the case, the patient's mouth should be swabbed out with a solution of sodium bicarbonate before and after feeds, or this may be used as a mouth wash.

SEMI-SOLID DIETS

As the patient progresses and becomes able to take solid food, toast or bread and butter, rusks or plain biscuits, may be added to the fluid diet. Stewed or fresh fruit, from which the skins and pips have been removed, may be taken, as well as boiled, poached, or scrambled eggs, milk puddings and custards, cereals and gruels. A choice of these will suffice for dinner until the patient is well enough to take fish, chicken, rabbit, etc.

At this stage some of the glucose or cream given in the fluid diet may be omitted if there is no need to increase the Calories.

DIET IN CONVALESCENCE

A convalescent patient should take food which is rich in protein and vitamins and which is readily digested, avoiding such foods as suet puddings, rich pastries, and cakes. The diet shown on p. 125 would be suitable. If there has been loss of weight a high calorie diet (p. 116) will be necessary.

DIET IN TYPHOID AND PARATYPHOID FEVER

During the acute stages of typhoid fever a high calorie diet with plenty of fluids is of the utmost importance in maintaining the patient's strength and in shortening the period of convalescence. The introduction of chloromycetin

has greatly reduced the duration of the fever, so that dietary treatment is much less of a problem than it used to be. The fluid feeds providing 3,000 Calories a day (p. 131) are suggested for the initial stages, but as soon as the patient is willing to take more solid food he may be encouraged to do so. The diet on p. 144 is suitable. In the final stages the diet on p. 143 may be used.

Paratyphoid fever is closely allied to typhoid but the illness is less severe and complications not so likely to occur. Dietary treatment is similar to that for typhoid but the patient will be able to take solid food after a shorter time.

DIET IN TUBERCULOSIS

The continued fever in this disease increases the energy requirements to 3,500 or 4,000 Calories a day, and the greatest attention must be paid to providing these in a suitable form. At one time a high fat diet was thought to be beneficial, later a diet rich in protein was advocated, but the modern view is that so long as the diet is high in calorie value and contains adequate amounts of all the dietary essentials it need not be particularly rich in any one constituent. At least four meals a day should be taken, with snacks at mid-morning and bedtime. Two pints of milk should be included daily and two eggs if possible. The diet must be varied according to the condition of the patient from a fluid (p. 131) or semi-solid (p. 130) to a normal high calorie menu (p. 116). Other diseases of the lungs, *e.g.* asbestosis and silicosis and pleurisy suspected of being tuberculous should be treated along similar lines.

DIET IN CASES OF FRACTURE

In cases of fracture of the femur, where otherwise healthy persons are confined to bed, sometimes for many months, it is necessary to devise a suitable type of diet. At first such persons are generally in negative nitrogen balance, and may

lose an appreciable amount of body protein. This begins within a day or two following injury, reaches a maximum within ten days, and then slowly declines. It has been shown that a diet rich in animal protein and of high calorific value modifies this loss. On the other hand, if such patients continue to eat high or even normal calorie diets they will tend to put on weight, since their physical activities must of necessity be restricted to a minimum.

Dietary treatment of cases of fracture, therefore, where the patient is confined to bed, consists in a high calorie, high animal protein diet for the first few weeks after injury, followed by a diet providing fewer Calories a day until the patient is able to resume his usual activities. The nature of the diet should be similar to that appropriate to a healthy person of the same age, and liberal amounts of calcium and vitamin D should be given.

Where the patient is not confined to bed a normal diet should be given, special attention being paid to a liberal supply of calcium and vitamin D.

In cases of fracture of the lower jaw where the jaw is completely immobilised, the fluid feeds, p. 131, are suitable. In less serious cases or during recovery, where the patient can move his jaw but is unable to chew, a very soft semi-solid diet, p. 130, may be given.

DIET IN DISEASE OF THE HEART

For dietetic purposes, heart diseases may be divided into two main types:

(*a*) Acute heart failure.
(*b*) Gradual heart failure.

(*a*) **Acute heart failure.** Adults of any age may suffer from acute heart failure, but it is far more common in old people than in young. In the acute stages small feeds should be given five times in the day and once during the night. Each feed should consist of about 5 oz. of milk with

cream, junket, jelly, and other light dishes. A sufficient amount of carbohydrate in a form easily assimilated is necessary, and for this purpose glucose is extremely useful. If œdema is present a low salt diet (see p. 203) may be advisable.

As the patient improves, white fish may be given, and fluid should be taken between meals in the form of water or orange juice. Later, meat and vegetables may be added. Even after the patient has recovered it is best to drink half an hour before meals, not with them, and bulky meals and all excess of food should be avoided.

(*b*) **Gradual heart failure.** This usually occurs in old people and may be accompanied by a raised blood pressure and anginal pains. The diet here follows no hard-and-fast rules, but should supply sufficient nourishment in an easily digestible form.

Patients with heart disease must avoid bulky and indigestible meals. The food should be plain, and taken in small amounts at fairly frequent intervals. Excessive amounts of fat and protein at the same meal should be avoided. Trouble is often caused when a large meal is taken just before bedtime. The diet should contain plenty of easily assimilable carbohydrate, and small amounts of sugared drinks or sweets may be taken between meals if the patient is normal in weight.

If the patient is overweight a cautious reduction of the excess is one of the objects to be achieved, since the task of carrying about the superfluous fat is merely giving unnecessary work to the heart. A reducing diet (see p. 121) should be given, but large portions of cabbage or other coarse vegetables should be avoided.

Patients with gradual heart failure sometimes have chronic nitrogen retention, in which case the physician may prescribe a diet low in protein (p. 197). If œdema is present a low salt diet (p. 203) may be given. There is no need to restrict fluids if the diet really contains very little sodium chloride.

CHAPTER VI

DIET IN DISEASES OF THE ALIMENTARY SYSTEM

DIETETIC measures are, generally speaking, most important in the treatment of disorders of the digestive tract, and some diseases are improved, or even cured, by careful attention to diet alone. For purposes of discussion, diseases of the alimentary system may be classified according to their site.

DISORDERS OF THE PHARYNX

(*a*) **Sore throat, post-tonsillectomy, tubercular laryngitis, quinsy.** These disorders are treated by a soft non-irritating diet which may be easily swallowed. The diet should consist mainly of milk and other fluids, which should not be taken hot, eggs, porridge, gruel, junket, custard, jelly, and ice cream. Minced meat or fish and stewed or very soft raw fruits may be given as soon as they can be swallowed. After tonsillectomy great care must be taken that no hard pieces of food reach the throat. Barley sugar and hard sweets must be avoided, and care must be taken that the pips of grapes, etc., are not swallowed. Salt foods and acid drinks should not be given.

(*b*) **Bulbar palsy.** In bulbar palsy the muscles of deglutition become paralysed so that swallowing is very difficult. Fluids regurgitate, and dry solids cannot be swallowed, so that only a semi-solid diet such as that shown on p. 130 will pass satisfactorily down the œsophagus.

DISORDERS OF THE ŒSOPHAGUS

(*a*) **Carcinoma.** The whole object of dietary treatment of carcinoma of the œsophagus is to supply the maximum

possible amount of nourishment through a gradually stenosing ring of malignant growth. At first an ordinary soft diet (p. 130) can be given but later, as the passage becomes smaller, a high calorie fluid diet must be supplied (see p. 131). Its basis is milk, reinforced with glucose or other sugar, cream, and raw eggs. Fruit juices to supply vitamin C, some source of the vitamin B complex, and salt should be given. Tube feeding may be resorted to, and high calorie feeds suitable for the purpose, or for gastrostomy cases, are given on p. 133.

(*b*) **Achalasia.** Here a semi-solid diet, similar to that used for bulbar palsy (p. 130), should be employed.

DISORDERS OF THE STOMACH

Patients suffering from disorders of the stomach have often become undernourished before their disorder is treated. Special attention should therefore be paid to the supply of vitamins and minerals, as well as of Calories. Small amounts of sodium chloride should regularly be used for seasoning (about 5 grams a day). The improved results which are obtained with more nutritious diets in the early stages of gastric and duodenal ulcer have been clearly demonstrated. The slightly larger soft bulk eaten does not hurt the ulcer, and the improved nutritional condition of the patient enables him to recover more surely and rapidly. Good mastication is most important in all disorders of the stomach, and attention should be paid to the teeth to ensure that they are in good order or, if the patient has dentures that these are well-fitting and comfortable.

(*a*) **Simple hyperchlorhydric dyspepsia.** Diets for simple hyperchlorhydria, without any organic lesion, are based on the same lines as those for gastric or duodenal ulcers, but being less drastic they resemble those given for convalescent ulcer patients.

The principle of treatment is to give small meals at frequent and regular intervals. The food should be plain and

unexciting, and, since the object of the treatment is to reduce the flow of hydrochloric acid into the stomach, all substances which might act as stimulants to gastric secretion, such as seasonings, meat extracts, alcohol, and acids like vinegar and lemon juice, should be avoided. Mechanical irritants, stalks, husks, and pips, must be forbidden. Diets suitable for this condition are given on p. 141.

(*b*) **Simple hypochlorhydric dyspepsia.** Abdominal discomfort after taking meals may be due to an insufficient secretion of hydrochloric acid into the stomach, though hypochlorhydria does not necessarily lead to dyspepsia. It has been shown that, of a group of normal healthy students, 4 per cent. had achlorhydria, but without any symptoms of indigestion.

If the discomfort can be traced to hypochlorhydria, small meals should be given, and fluid should be taken *between* meals and not with them. The food should be sufficiently tasty to stimulate the flow of gastric juice, and doughy foods should be avoided. The patient should be carefully questioned as to which foods he has found by experience to disagree with him, so that they may be omitted from his diet. Specimen diets are given on p. 135.

(*c*) **Gastric or duodenal ulcer.** The object of medical treatment of gastric or duodenal ulcer is to maintain the stomach as far as possible in a state of muscular and glandular rest and in an almost alkaline condition for a sufficient length of time to allow the ulcer to heal. To these ends, belladonna may be given to reduce the muscular movement of the stomach and to depress secretion, and alkalis are often administered to neutralise the hydrochloric acid which is secreted. Olive oil is frequently prescribed before meals to reduce stomach motility. Smoking should be forbidden, as it tends to stimulate gastric secretion, and worry should be avoided as far as possible.

The object of the dietary treatment is to irritate and stimulate the stomach as little as possible, and at the same

time to supply sufficient protein at short regular intervals to " buffer " the acid that may be secreted. The diet consists of non-irritating food, at first in fluid or soft form such as egg and milk or milk puddings, and purées of apple and other fruits, given frequently.

It is important that during the first stages of treatment the patient should be in bed. It must be emphasised that there is no one standardised treatment for gastric ulcer, either dietetically or medically, though the principles outlined above form the basis of all types of treatment. The more each individual case is treated on its own merits the better.

There are several gastric ulcer diets in common use. That based on Lenhartz's treatment (see p. 136), depends upon the feeding of eggs, milk, and sugar or glucose at two-hourly intervals by day and four-hourly by night. The early stages of this diet are very inadequate in Calories, and are rarely used except after gastrectomy.

The Sippy type of diet gives a larger amount of fat with a view to depressing the secretion of hydrochloric acid. It provides less carbohydrate than the Lenhartz diet, but it includes a good supply of digestible protein. It consists essentially in the hourly administration of equal parts of milk and cream.

A newer form of diet, which patients usually find more palatable, even when they are very ill, is based on the discovery of Meulengracht that patients suffering from gastric or duodenal ulcer could be given soft solids, including such foods as milk puddings, mashed potatoes, and pounded fish immediately after hæmatemesis without ill effect. It is suitable for the first three weeks of gastric ulcer treatment, and may also be used as an interim diet during investigation. It consists of small two- or three-hourly feeds composed of one or more of the following foods : milk, cream, sugar, stale bread (not wholemeal) or dry biscuits, butter, eggs, junket, jelly, custard, milk pudding, ice cream, or

proprietary infant or invalid food, with suitable fruit and vegetable purées if desired. Examples of the arrangement are given on p. 139.

The advantages of this diet over previous types are that it supplies more Calories, increases the fluid intake of patients who may have become dehydrated by hæmatemesis and vomiting, and gives a wider variety of flavour and texture.

For patients at home or at work arrangements for frequent feeding are facilitated by the use of a thermos flask. If the family is not in a position to give the patient constant attention, feeds can be kept in the flask, and the patient himself can take a portion from it every two hours and during the night. At night time a thermos is invaluable, as the patient can take a drink of warm milk on waking without being unnecessarily disturbed.

(*d*) **Convalescence from gastric and duodenal ulcer.** The diets on p. 141 are intended for patients resuming normal activities. At first meals and snacks should be of approximately equal size and taken at intervals of two or two and a half hours. The four main meals should be gradually increased to ensure that normal weight is regained or maintained, though really large meals must be avoided. Treatment with alkalis and olive oil is usually continued during convalescence. Vitamin C must be provided either in the form of strained fresh orange juice, 2 to 6 oz. between feeds, or in synthetic form as ascorbic acid tablets. Larger doses of these will be necessary if the patient has been on a diet deficient in vitamin C for some time. Water may be taken between meals as desired. No irritating or over-stimulating foods such as wholemeal bread or other foods made from whole cereals, pips or skins of fruit, vinegar, alcohol, pickles, or highly seasoned foods should be taken. Feeds must not be very hot nor very cold, though when convalescence is well established a small portion of ice cream may be allowed after a meal. Weak tea and milky coffee may also be allowed at this stage. It must be remembered that optimum nutrition

is the object of treatment, and as times goes on and the ulcer heals the main emphasis should be on the importance of meals taken at regular moderate intervals and the avoidance of over-eating or of gross irritants rather than on restrictions which make the patient's life a burden and tend to be broken if they are too numerous. Those who have suffered from gastric or duodenal ulcers must, however, realise that unless they continue to keep to the essential routine they will almost certainly have a relapse and that, however well they may feel, they must take their restrictions seriously in order to prevent this happening.

People who have had gastric or duodenal ulcers should not get up during their meals or for twenty minutes afterwards. To ensure this a housewife, for example, may have to take some biscuits and milk before getting up, and postpone her breakfast until the rest of the family have had theirs. She should not wash up immediately after her meal. For those who work away from home it is usually possible to secure five minutes or so between meals for the necessary snack, which may consist of one or two biscuits. Those who travel a great deal, and those who have social engagements to keep, must plan for themselves schemes whereby the hours for feeds are always observed, and some suitable food taken at similar hours every day. For these a packet of biscuits in the pocket or handbag, to be eaten in the car or train, are the best insurance against a recurrence of the discomforts of hyperchlorhydria.

(*e*) **Carcinoma of the stomach, chronic gastritis of pernicious anæmia, arsenic, or other poisoning.** Here the diet must contain the maximum possible amount of nourishment in a concentrated, light, non-irritating form. All kinds of roughage must be avoided and small meals should be given at frequent intervals. The diet should consist mainly of milk reinforced with carbohydrate such as semolina, cornflour, or invalid food, eggs, custards, jellies, junket, etc. Details are given on p. 125.

DISORDERS OF THE SMALL INTESTINE

(*a*) **Idiopathic steatorrhœa. Sprue and cœliac disease.** Adults suffering from sprue, or children suffering from cœliac disease, are able to digest fats in the normal way, but they are unable to absorb the products of digestion to the same extent as a normal person. Their stools, therefore, contain excessive amounts of fatty acids and calcium soaps. Sprue is frequently accompanied by a type of anæmia very similar to pernicious anæmia, and tetany may result from the poor calcium absorption. The constant diarrhœa may lead to sodium chloride and also possibly potassium deficiency and the urine should be tested for chloride as a routine. If it is absent the patient should be given additional salt.

It has recently been shown that in the case of children suffering from cœliac disease, starch is very badly tolerated, and it is partly the fermentation of starch in the intestine which hinders the absorption of fat. By eliminating starch from the diet, fat absorption can be increased.

The principle of dietary treatment in all cases of idiopathic steatorrhœa is to give the patient as many Calories as possible in the form that he can best tolerate. This is usually achieved by a diet which contains very little starch and often very little fat as well. In the early stages it consists largely of skimmed milk and glucose. Yeast or liver extracts should be given for the anæmia and concentrates of vitamins A, D, and C.

A general diet for idiopathic steatorrhœa low in starch and fat and high in protein is given on p. 156. This will have to be modified for infants suffering from cœliac disease. The fat of cow's milk is often particularly badly tolerated by them and any fresh milk that is given should be completely skimmed. The first stage of the diet consists of one of the proprietary infant foods containing only small amounts of fat and increased protein, *e.g.* Sprulac, or a skimmed dried milk, *e.g.* Cow and Gate. Fresh fruit juice carefully strained

should be given daily, but if this has to be omitted on account of the diarrhœa, ascorbic acid tablets should be used. Glucose or dextri-maltose should be added to each feed. Various other protein foods should be included in the diet as soon as possible, *e.g.* pounded chicken, or rabbit, steamed fish, scraped steak, and proprietary protein preparations such as Casec, Casumen, Sanatogen, or Plasmon. Yeast extract should also be given daily.

The third stage consists of adding starch to the diet. This must be done very cautiously and a suggested dietary arrangement is given on p. 155.

(*b*) **Lienteric diarrhœa.** Small, dry meals should be given, and no drink should be taken with food. Plenty of fluids should, however, be supplied between meals. The food should never be very hot, and should contain as little roughage as possible. For suitable diets see p. 143.

(*c*) **Typhoid fever.** See p. 59.

(*d*) **Jejunostomy.** Suitable feeds are given on p. 133.

DISORDERS OF THE PANCREAS

(*a*) **Chronic pancreatitis, obstruction of the pancreatic duct.** In chronic pancreatitis the secretion of enzymes by the pancreas is apt to be deficient, and in obstruction to the pancreatic duct the secretion is unable to reach the intestine. In both disorders, therefore, the parts of the digestive process for which the pancreatic enzymes are responsible may be ineffectively carried out. The digestion of fat is most likely to suffer, but also the digestion of protein and starch. Even when the digestion of fats is incomplete, however, protein and starch may be relatively well tolerated and, of the three, starch is least likely to be affected.

Dietary treatment is difficult, since fat must be avoided, and it may be necessary to omit starch and meat as well. The diet should consist mainly of skimmed milk, sugar, and fruit. Peptonised protein foods may be found to be of value in some cases. A suggested diet is given on p. 154.

(*b*) **Fibrocystic disease of the pancreas.** This is an illness of young children, often associated with similar cystic changes in the lungs, which is easily confused with cœliac disease. Its effect is to reduce very considerably the external secretion of the pancreas. Symptoms are present at birth, in contrast with cœliac disease where the children usually develop normally for several months up to a year or more. Cœliac children have very poor appetites, whereas infants with pancreatic fibrosis have voracious ones, but in spite of this they fail to thrive. Their stools contain unabsorbed and decomposed dietary protein as well as an excess of fat and starch.

The diet should consist of peptonised skimmed milk (Peptolac), with added protein hydrolysate. Carbohydrate should be given in the form of predigested wheat flour, *e.g.* Benger's Food, and dextri-maltose used for sweetening. 1·3 g. of pancreatin should be given three times a day before meals.

The Calories should be adequate for the child's age and expected weight, plus an excess to compensate for loss caused by faulty digestion and vomiting. Concentrates of vitamins A, D, C, and the B complex must be given.

When the infant is old enough to take a mixed diet, two teaspoonfuls of carefully sieved vegetable may be given, and if this is well tolerated, one teaspoonful of minced liver can be made into a broth with sieved vegetable and yeast extract. Baked egg custard, sieved fruit, scraped lean beef, and pounded steamed white fish may later be included. Low fat soya flour may be added to soups, and dextrinised rusks given when the teeth have erupted.

During the early stages of weaning, starch-free foods should be given, but later the starch-containing foods may be gradually introduced.

BILIARY DISEASES

(*a*) **Acute cholecystitis.** Here the utmost dietetic rest is necessary. The diet should be exceedingly light, including

plenty of fluids. It should consist in the early stages of fruit juice containing added glucose, and later a light, low fat diet should be given (p. 148).

(*b*) **Chronic cholecystitis, or other gall-bladder diseases with or without gallstones.** The essentials of diet for chronic cholecystitis are small, equal, and regular meals. Mixtures of fats and starches should be avoided, and coarse, irritating bulky foods should not be given. The cookery should be as plain as possible, and the patient should refrain altogether from such foods as buttered toast, potatoes mashed with butter, white sauce, and fried foods and pastries. Bread and butter is sometimes quite well tolerated. The diets suggested on p. 125 may be used. If the patient is overweight, a low calorie diet such as that suggested for patients with heart disease (p. 121) may be used, slightly modified to conform with the above principles.

Cholesterol-free diets are frequently prescribed for patients suffering from gallstones. They are difficult to construct and of doubtful value, since cholesterol is synthesised in the body far more easily than it is absorbed from the food.

LIVER DISEASES

(*a*) **Infective hepatitis or catarrhal jaundice, and homologous serum jaundice.** Infective hepatitis is a common disease of the liver in this country. The mode of spread is considered to be by droplet infection. Homologous serum jaundice, which is closely allied clinically, has frequently occurred in recent years following the injection of serum or vaccine when these have been prepared from human serum. Since the introduction of arsenical drugs for the treatment of syphilis, there have been many reports of homologous serum jaundice occurring at various stages of the treatment. Some authorities consider that as a result of drug treatment the liver is rendered more susceptible to infection, but it seems more likely that infective blood from one patient is carried to another because of imperfect sterilisation of syringes.

The real problem of dietary treatment during the acute stages of both diseases is that the patient does not want to eat at all, and the first consideration is to provide him with adequate Calories to prevent tissue breakdown and enough fluids to prevent dehydration. Many doctors consider that the fat should be kept low and the diet built up mainly from protein and carbohydrate foods. Such diets tend to be rather unappetising, however, and should the patient have a desire for some fat food, it is better to let him have it than no food at all. During the early stages skimmed milk should form the basis of the diet, and later a high protein, low fat diet (p. 150) is suitable.

(*b*) **Cirrhosis** is not a common disease in Great Britain, and our conception of it has been considerably extended in recent years. It is always the result of a deficiency or a chemical injury. It used to occur among alcoholics, and there is no doubt that it can be caused by dietary deficiencies. This has been demonstrated experimentally in animals, and the disease is often seen among malnourished natives of Africa, India, and Ceylon. The cause in this country is generally unknown. The experimental work led to the suggestion that a methionine deficiency might be of great importance, but the use of this amino-acid as a therapeutic agent has been disappointing.

There have been many different régimes suggested during the past twenty years for the dietary treatment of cirrhosis. The present tendency is to give a diet high in protein and carbohydrate and low in fat, with supplements of vitamins A and D. An example of such a diet is given on p. 150.

Some workers have suggested that patients benefit very greatly from doses of methionine, but others have not been able to detect any effect.

(*c*) **Toxic jaundice due to liver poisons.** Exposure to certain poisons such as T.N.T., chloroform, or carbon tetrachloride may injure the liver and lead to jaundice. There may be a long period between exposure and the appearance

of symptoms. There is evidence from animal experiments that the symptoms are alleviated by a high calcium diet, and that meat and meat extracts have the reverse effect. A high fat diet should definitely be avoided, and until we know more about this disease a diet high in carbohydrate and calcium, moderate in protein, and low in fat would seem to be indicated. Meat should be avoided, but milk protein appears to be harmless, and milk should be relied upon to provide 30–40 g. of protein a day. It must be emphasised, however, that little work with humans has been done on this subject and it may be found later that some other dietary treatment is preferable.

(*d*) **Obstructive jaundice.** Obstruction of the bile passages by gallstones or by malignant disease does not necessarily involve any damage to the liver cells. In addition to medical or surgical treatment for removal of the obstruction, a low fat diet (p. 148) is usually prescribed. Plenty of skimmed milk should be included and the low fat fortified milk mixture (p. 241) is useful in the acute stages.

DISORDERS OF THE COLON

(*a*) Constipation

The dietary treatment of constipation depends entirely upon its cause.

1. **Cæcal stasis.** This type of constipation is treated by increasing the bulk of the fæces, and therefore by increasing the roughage in the diet. Roughage is derived mainly from whole cereals, such as brown bread, and oatmeal, vegetables, and some fruits (see Table, p. 146). A typical high residue diet is given on p. 145.

Regular defæcation, without a feeling of rush, is as important as diet. Plenty of fluids should be given, and an increased supply of vitamin B_1 may be beneficial. There is a popular belief that certain foods are " constipating." No satisfactory evidence exists on this point, and patients who

have given up milk puddings, cheese, and eggs under the impression that they were " binding " seldom seem to have become less constipated. They are, however, often less well-nourished as a result of their deprivation.

2. **Spastic constipation.** This is frequently treated by giving a low residue diet (p. 143) in order to rest the colon as much as possible. Some rich source of the vitamin B complex, such as yeast extract, should be given daily.

3. **Rectal stasis.** This condition is not benefited by dietetic treatment.

(*b*) **Diarrhœa**

1. **Acute diarrhœa with or without vomiting.** Sudden acute upset of the digestive system, whether due to food poisoning or other causes, with diarrhœa and vomiting, is treated dietetically by giving no food at all for the first twenty-four hours. Plenty of water should be administered, and saline should always be given subcutaneously or intravenously in severe cases, to make good the loss of water and sodium chloride in the vomit and the fæces. Glucose water or barley water may then be given by mouth and diluted milk, eggs, and jelly as the patient improves. Later biscuits, butter, proprietary invalid foods, and puddings such as custard, blancmange, and junket should be added. Finally, a low residue diet (see p. 143) should be taken until health is fully re-established.

2. **Chronic diarrhœa.** Patients suffering from chronic diarrhœa must avoid all foods containing cellulose (roughage). Food should not be too hot nor too cold, and the meals should be small. If the patient is troubled with flatulence, starchy foods should be restricted, and if the stools are offensive it may be advisable to give no meat. The diet should be based on eggs, milk, jelly, junket, custard, fruit juice, steamed fish, clear soup, etc., and ascorbic acid tablets should be given if the diet is continued for any length of time. A vitamin B_1 concentrate may prove useful. For

the later stages a low residue diet (see p. 143) should be given. It should be increased in quantity and nature until a full diet is tolerated.

(*c*) Amœbic and bacillary dysentery

During the acute stages dietary treatment should be the same as that described for acute diarrhœa. As the patient recovers, a high protein, low residue diet such as that used for ulcerative colitis (p. 143) should be given.

(*d*) Colitis

1. **Ulcerative colitis.** A diet without roughage is essential in colitis, but a high calorie diet containing plenty of protein should be given, since patients suffering from colitis usually lose weight. A suitable diet is given on p. 143. It consists mainly of fresh or dried milk, milk puddings, eggs, toast, stale bread (not wholemeal), biscuits, butter, steamed fish, etc. Plenty of water should be given, and strained raw fruit juice, such as lemon, orange, or tomato, should be served daily to supply vitamin C.

2. **Mucous colitis.** Opinion as to the dietary treatment of mucous colitis varies. Some physicians prescribe a low residue diet (see p. 143), and others give roughage in moderate amounts (p. 125). During convalescence the light, easily digested diet on p. 125 is suitable.

CHAPTER VII

DIET IN DIABETES

Diet in diabetes is nowadays planned to suit a lowered tolerance for carbohydrate, whilst giving adequate nutrition from every point of view. With insulin at hand, diabetics can be fed according to the ordinary rules of physiology. A diabetic to-day is not an invalid; he is usually up and about, doing his normal work, and he needs food which will maintain him in full health and vigour. In the case of children it is especially important that the diet should be adequate from the start, and the general principle to be followed is to give diabetics diets as nearly as possible like those appropriate to healthy people of a similar age and occupation.

Insulin. Three kinds of insulin are now in general use, and a summary of the different strengths in which they are sold is given on p. 86.

1. *Soluble insulin*, first prepared by Banting and Best in 1922, revolutionised the treatment of diabetes. It is made from the pancreas of animals. Its maximum action in reducing the blood sugar is reached about four hours after injection, and it is therefore often given both morning and evening in order to secure control during a great part of the day.

2. *Protamine zinc insulin* is a compound of insulin with a protamine prepared from fish roe, combined with a small proportion of zinc. It has a much more prolonged action than soluble insulin; the effects of an overdose are most likely to be felt 8 to 20 hours after injection.

3. *Globin insulin* is prepared from insulin, globin, and zinc chloride. The globin is obtained by removing the porphyrin group from hæmoglobin. Globin insulin is also

slower acting than soluble insulin, reactions being most likely to occur 6–12 hours after the injection.

Owing to the delayed action of the protamine zinc and globin insulins some physicians prescribe a dose of ordinary insulin at the same time as the slow-acting insulin in the morning. This can be given in one injection from an insulin syringe.

In pre-insulin days the usual dietary treatment for diabetics was preliminary starvation for a few days, followed by the administration of a low carbohydrate, high fat diet until maximum carbohydrate tolerance was reached. Such treatment generally led to under-nutrition. With the introduction of insulin under-nutrition was no longer necessary, but the tendency to give low carbohydrate, high fat diets remained for some time. Examples of these are readily available in the older books and are not given here. With such low carbohydrate diets it was an almost invariable practice to weigh all the food.

As time went on most physicians recognised the advantage of higher carbohydrate diets, and in the case of children they proved to be almost a necessity. In serious cases of diabetes all food may still have to be weighed until the correct balance between insulin and carbohydrate has been determined, after which most doctors now usually prescribe diets in which only the carbohydrate is measured or weighed, and the protein and fat are left to the patient's own choice.

THE PLANNING AND CALCULATION OF DIABETIC DIETS

Arrangement of carbohydrate in the diets. The arrangement of carbohydrate in a diabetic diet depends on whether the patient needs insulin or not, and if he does require it, which type is prescribed for him, soluble, protamine zinc, or globin. If no insulin is required, as is often the case with elderly or obese patients, the carbohydrate should be

divided evenly between the day's meals. With soluble insulin, since the maximum effect of reducing the blood sugar occurs about four hours after injection, more carbohydrate should be given in the meals after the injections than between them. If there are two injections, morning and evening, lunch should contain less carbohydrate than breakfast, and tea less still, since the effect of the last injection will have disappeared by then. If a morning injection only is given, most carbohydrate (about a third of the day's allowance) should be taken at breakfast, and less and less carbohydrate eaten at the subsequent meals. If protamine zinc or globin insulin is being used, overdoses may be expected six to twenty hours after the insulin has been given, and doctors usually prescribe carbohydrate late in the day, or even at bedtime, to prevent nocturnal hypoglycæmia. If soluble insulin is given with one of the slow-acting insulins before breakfast, the meals are arranged in much the same way as they are when two doses of soluble insulin are being given, and most carbohydrate is generally prescribed at breakfast and supper.

Examples of carbohydrate arrangement with different kinds of insulin are given on p. 158, but it must be emphasised that these are only examples and not hard-and-fast rules. Patients must be treated individually, and each person's own response to insulin taken into account in arranging his diet.

Diets with weighed carbohydrate. These diets are built up on food portions giving 5 grams of carbohydrate, or multiples of these amounts. Protein and fat foods are left to the patient's own choice and appetite. Examples of such diets for use with different kinds of insulin will be found on pp. 159–173, and the list of 5-gram carbohydrate portions of various foods (p. 187) will enable those looking after diabetics to vary the calculated diet by substituting one 5-gram carbohydrate portion for another.

Diets with measured carbohydrate. In mild cases of

diabetes, where the patients are elderly or stupid but have regular dietary habits, qualitative restriction of carbohydrate to an approximate figure may be all that the patient requires or can carry out, and better clinical results may be obtained, even with insulin, than by false reliance on more accurate methods. Lists of foods which are allowed in unlimited quantities are given on pp. 178, 190. Carbohydrate foods are prescribed in tablespoons, teaspoons, or, in the case of bread, by measure. Further details of this method of diet prescription are given on p. 178. This method, though it works well in selected cases should not be allowed to take the place of accurate dietary treatment unless it is impossible to explain more exact and varied diets to the patient.

Diets with weighed carbohydrate, protein, and fat. A few physicians still consider it preferable to prescribe a diet in which protein and fat foods as well as those containing carbohydrate are weighed. For such diets the list of food portions giving 5 grams of carbohydrate will be found useful, and also those providing 7 grams of protein and 7 grams of fat (p. 301). In calculating these diets the carbohydrate should be dealt with first. The amounts of food required to make up the prescribed carbohydrate should be written down, and the protein and fat in each food added. The quantities of food needed to obtain the total amount of protein should then be filled in, and, lastly, butter and margarine should be used to make up the fat.

If the patient is receiving insulin, whether once or twice a day, it is important that he should weigh all his food until he has learned to judge the weights correctly. In any case the food should be weighed for a few meals once a fortnight or so to prevent errors creeping in. The diet should also be weighed for some days every time it is altered. It is probably wisest always to weigh the concentrated carbohydrate foods, bread, toast, etc., and to guess only the protein and fat foods and the bulky carbohydrates.

Patients should understand that they *must* take the correct amounts of carbohydrate foods at the prescribed meals, but that protein and fat foods may be divided among the meals as desired, provided the daily totals are correct. The times of meals may be varied within reason, provided that insulin, if used, is taken at whatever times before meals it has been ordered by the doctor.

The Line Ration Scheme. The *Line Ration* diet scheme devised by Dr. R. D. Lawrence, and reprinted on p. 174 by the courtesy of Messrs. H. K. Lewis, simplifies the calculation of the diabetic diet. Each black line contains 10 grams of carbohydrate and each red line $7\frac{1}{2}$ grams of protein and 9 grams of fat. The physician prescribes the desired number of black and red portions, the red lines usually being less in number than the black lines, and the patient has only to choose his foods and to weigh them accurately. An example is given on p. 176.

The Line Ration scheme may also be used for diets in which only the foods containing carbohydrate are weighed. Here, the number of black lines is prescribed, and foods printed in red are allowed in average helpings. An example is given on p. 177.

Diet for diabetics during illness or after operation. In cases of illness, or in an emergency, the correct amount of carbohydrate must be given, but it is usually unnecessary, if the patient is on a weighed protein and fat diet, to attempt to adhere strictly to measured amounts of these. Indeed, the fat intake should be reduced, as there is a risk of ketosis when diabetics are ill.

Fluids must be given where patients cannot take solid food, and ordinary sugar, glucose, or lactose may be used to supply carbohydrate in concentrated form. Milk, sugars, and fresh fruit drinks, Ovaltine and Bournvita, eggs where possible, and flavourings of tea, coffee, yeast, and meat extract form the basis of fluid diets for diabetics. Horlick's Malted Milk is often tolerated particularly well. For fluid

and light diets and diets suitable for patients with diarrhœa see pp. 188–190.

Since diabetic patients have usually lost the taste for sweet foods, glucose or lactose may be more acceptable than ordinary sugar. Even the sweetness of glucose may need to be disguised by lemon juice. The amounts of carbohydrate must be similar, meal by meal, to those taken in health. This is particularly important for patients taking insulin. If the patient is very ill his meals may have to be given at two-hourly or even hourly intervals. If insulin is being given at the usual times, care must be taken that the amounts of carbohydrate during the day are divided in the same way as in the ordinary diet.

If the patient has shown a tendency to vomit it is wise, before giving the insulin, to make sure that the carbohydrate has stayed down.

Emergency diets. In cases of emergency, where a known amount of carbohydrate must be given without delay or where scales are not available, the list of food measures on p. 191 will be found to be of assistance.

Emergency treatment where patient cannot take food. If the patient is unable to take any food whatever owing, for instance, to vomiting, and the previous insulin and food have been taken as usual, the physician should be consulted immediately and half the usual dose of insulin should be given. As the patient improves, bread or biscuits may be given in place of sugar, 1 oz. bread or $\frac{3}{4}$ oz. unsweetened biscuits being equal in carbohydrate value to $\frac{1}{2}$ oz. sugar or glucose (15 grams carbohydrate). (See pp. 184–186.)

Diet for diabetics with tuberculosis. Diabetics, like other patients suffering from tuberculosis, need a diet providing more than the normal number of Calories, and should have an ample supply of foods rich in minerals and vitamins, especially milk. Suggested diets for tuberculous diabetics are given on p. 182, containing 300 grams of carbohydrate.

Diets for diabetic children. The principles underlying the

treatment of diabetic children are exactly the same as those for adults, but in the case of children ample food must be supplied for growth as well as for maintenance. Diabetic children's calorie intakes tend to be low because they find it difficult to eat enough protein and fat to make up for the carbohydrate they are forbidden. Estimated calorie, protein, and mineral requirements of normal children of various ages are shown on p. 312. A diet supplying the full requirements should always be prescribed as soon as possible, and it should include at least 1 pint of milk per day. Cheese is an excellent source of calcium, and may be given as cream or milk cheese to children who are too young to take the ordinary varieties. Diets suitable for diabetic children are given on p. 172.

Diabetic children should learn to feel that their dietary restrictions are different from, but little more irksome than, those of other children. Nowadays diabetic children have nearly as good a choice of foods as other children, with the exception of sweets, and they may be compensated for this deprivation by being given extra pocket money to spend on other coveted luxuries. In order to counterbalance any feeling of inferiority, diabetic children should be made to realise that they are a little cleverer than most people in knowing about the foods that suit them, and that they can exercise grown-up self-control in resisting the temptation to eat or drink those which would not be good for them. The less they feel that their family and friends are sorry for them the happier the children will be.

"Buffer" meals. All diabetics having soluble insulin, particularly children, should have extra carbohydrate before taking strenuous exercise in the morning in order to prevent too great a lowering of the blood sugar. Three-quarters of an ounce of unsweetened biscuits (*e.g.* three average water biscuits), ½ oz. of sugar, boiled sweets, or barley sugar, or 1 oz. of chocolate, to supply 15 grams of carbohydrate, are often given about ten minutes before exercise such as riding

or swimming. There is no danger from eating small amounts of biscuits or other carbohydrate foods before swimming, as they are very rapidly digested and absorbed. After exercise later in the day the additional carbohydrate should be taken with the tea or evening meal. The principle of " buffer " meals applies equally well to patients taking protamine or globin insulin, but the physician should be consulted as to the times of day at which it is advisable to take extra carbohydrate.

Special rations for diabetics. When food rationing was introduced in England in 1940, arrangements were made for granting special rations and priority allowances to diabetics. These consisted, in 1950, of 3 rations of meat, 12 oz. of cheese, 12 oz. of butter and margarine in addition to the normal ration, and sometimes also 7 pints of milk per week. The sugar ration was cancelled.

Foods suitable for diabetics. It is no longer reasonable to lay down rules as to suitable and unsuitable foods for all diabetics. People with hearty appetites on the restricted diets should not be given concentrated carbohydrate foods such as sugar, jam, cakes, fruit tinned in syrup, and sweetened coffee essence, since they will not feel satisfied if they are given their ration of carbohydrate in this form. For them the food extras on pp. 178, 190 will add variety and bulk to the diet and should be considered in planning the menus. Recipes for soups, savouries, and puddings are given on pp. 250–255; for further recipes see Lawrence, *Diabetic ABC* and publications of the Diabetic Association.

Patients on higher carbohydrate diets, with normal appetites, as well as those with small appetites on lower carbohydrate diets may well feel satisfied, even though part of their food is in the form of more concentrated carbohydrates. The doctor, nurse, or dietitian should be most careful not to introduce them if the patient lacks self-control over his diet or often feels hungry. School children, for instance, like to eat till they feel full, and would be made

miserable if much of their carbohydrate allowance was given in the form of small amounts of sweets. If concentrated carbohydrate foods are used they must be weighed with the utmost care, as small errors in the amounts eaten, whether too much or too little, may have serious consequences.

The chemical composition of a number of everyday dishes is given in Table I, p. 269, and the amounts containing 5 grams of carbohydrate are shown on p. 189. The dishes must be made carefully from the recipes (p. 214), from weighed amounts of ingredients. The portions eaten should also be weighed frequently, otherwise serious dietary errors may creep in.

Special diabetic foods. Now that most diabetic diets are comparatively liberal, and provide bread at any rate in moderate amounts, bread substitutes are no longer necessary. They should be forbidden as extras since most of them contain appreciable amounts of carbohydrate. Should patients insist on eating them, their carbohydrate value must be ascertained and reckoned into the calculated diets.

Diabetic cakes and sweets, with the exception of some jujubes, all contain carbohydrate, and if taken must be allowed for in calculating the diet.

Sweetening. Saccharine may be used to sweeten beverages, puddings, and fruit. Half a tablet is sufficient for most people in a cup of tea, and there will be a bitter taste if more than one tablet is used. A pinch of bicarbonate of soda added before the saccharine to very tart fruits will counteract their acidity.

Proprietary jams, marmalades, and jujubes for diabetics usually contain glycerine, which forms sugar in the body. Provided these are taken in small quantities no harm will be done. They must, however, on no account be " made a meal of." Diabetics will find sugarless marmalade on the whole more palatable than jams. There are several good makes on the market.

A recipe for home-made marmalade for diabetics is given on p. 255. As it is made with gelatine it will only keep a few days.

Overdoses of insulin. Patients should be taught to recognise overdoses of insulin, characterised by a feeling of giddiness, difficulty in speaking, shaking and trembling, and cold sweats. Children, and even adults, may become unreasonable, and often suddenly lose consciousness. Provided the patient is keeping carefully to his diet, and to the prescribed interval between insulin and meals, an overdose of insulin should be regarded as a good sign, showing that less insulin or more carbohydrate is required. The physician should always be consulted, and he will decide whether to reduce the insulin dosage or to increase the food.

Every patient receiving insulin must always carry sugar with him for use in case of an overdose of insulin. A safe rule is to put sugar in a pocket of every suit or in every handbag the patient possesses and never to take it out except for use or replacement. If he feels the symptoms of an overdose of insulin he should take a lump immediately.

NOTE ON THE SALE OF INSULIN IN GREAT BRITAIN

All insulin in this country is sold under licence granted by the licensing authority set up by the Therapeutic Substances Act, 1925, and all insulin supplied for use in Great Britain and Northern Ireland must conform to the standards of strength, quality, and purity laid down in the Regulations made under the Act. The various types and strengths of insulin are packed in cartons of different colours. Soluble insulin, including the solutions prepared from the pure crystalline material, is issued in three strengths, viz., 20 units per c.c. (yellow), 40 units per c.c. (blue), and 80 units per c.c. (green). These are sometimes referred to as "single," "double," and "quadruple" strengths respectively.

Protamine zinc and globin insulins are issued in two strengths, viz., 40 units per c.c. and 80 units per c.c. The colours of the packings are as follows :

Protamine zinc	40	units per c.c.	pink and blue.
,, ,,	80	,, ,,	pink and green.
Globin	40	,, ,,	blue and orange.
,,	80	,, ,,	green and orange.

As insulin is labelled in units per c.c., and the strength is not otherwise indicated on the packet, it is most important to see that the kind used agrees with the doctor's prescription. A patient requiring an injection of 20 units of insulin, for instance, would take 1 c.c. of the 20 units per c.c. solution in his syringe, but only 0·5 c.c. of the 40 units per c.c. solution, or 0·25 c.c. of the 80 units per c.c. solution.

CHAPTER VIII

DIET IN DISEASES OF THE KIDNEYS, INJURY DUE TO BURNS, GOUT, AND RHEUMATISM

DISEASES OF THE KIDNEYS

THE value of diet in diseases of the kidneys varies greatly. In some cases treatment by diet may be of temporary or permanent benefit to the patient, but the nature of the disease almost precludes a cure by diet alone.

For dietetic purposes nephritis may be divided into four classes, and the treatment of each involves some regulation of the amount or kind of protein taken.

Acute Nephritis

This condition lasts only for a short time, and dietary treatment can therefore be concentrated on supplying fluids and reducing the protein metabolism in order to relieve the kidneys as far as possible. Fruit juices with at least 250 g. of glucose, lactose, ordinary sugar, or barley sugar a day, supply nourishment during the first stages of the disease. Such a diet provides very few Calories, however, and contains no protein, and the patient will not be in nitrogen equilibrium on it. Other foods should be added as soon as possible, particularly milk drinks, and the patient can gradually proceed to a semi-solid diet (p. 130) and then to a light easily digested one (p. 125). If the blood urea remains high it may be advisable to keep the protein intake down to 40 or 50 g. a day, in which case the low protein diet (p. 197) would be suitable in the convalescent stages.

Chronic Nephritis with Œdema but without Nitrogen Retention

In this type of nephritis, where a great deal of protein is being lost through the kidneys and where the blood urea is normal, the logical treatment is a high protein diet. One example of a high protein diet is given on p. 196. In addition to this, a low salt diet is often prescribed to relieve the œdema (see p. 203).

If the patient is very œdematous a more strictly low salt diet may be desirable. In such cases protein may be administered in the form of " casein bread " and synthetic low salt milk (see pp. 260, 261).

Chronic Nephritis without Œdema but with Nitrogen Retention

In these cases the excretion of nitrogenous end products by the kidneys is very much impaired and the urea in the body fluids tends to rise to very high levels. The treatment of this type of nephritis is, therefore, a diet low in protein and high in carbohydrate and fat. Typical low protein diets are given on p. 197. As a rule, patients with uræmia have poor appetites, and if they are not encouraged or coaxed to eat, they will not take enough food to cover their requirements.

As this disease is of long, usually of life-long duration, the general health and enjoyment of the patient must be considered, as well as the effect of the food on the kidneys. If a diet very low in protein is taken for any length of time the patient's own reserves of body protein may be depleted, and he will be less able to withstand the disease than ever. Not less than 40 grams of protein a day should be prescribed if the diet is to be used for a long time.

The question as to whether " red " meat is in itself more damaging to the kidneys than " white " has not yet been solved by the medical profession. The amount of purine,

and extractives in red meat (with the exception of glandular tissues) is no higher than in white, and some physicians make no difference between them, provided digestion is good.

For less severe cases a diet with the total amount of protein not exceeding 60 grams a day may be satisfactory. Some physicians order alkaline ash diets. The body is usually sodium-deficient, and the advantages of an alkaline ash are presumably to reduce the sodium shortage. It is therefore most important to give sodium salts rather than calcium salts to make the ash alkaline. Alkaline diets can be constructed from the tables on p. 269. It may be noted that milk is the only food with an alkaline ash containing much protein, and furthermore the protein is of high biological value.

The clear-cut cases of nephritis already discussed lend themselves to dietary treatment and benefit accordingly. Unfortunately a common clinical type of nephritis, especially in children, is a combination of the two types of chronic nephritis discussed above, each demanding exactly the opposite dietary treatment to that of the other. If nitrogen retention and œdema occur together then a diet low in protein and sodium chloride may be required. Such cases must, however, be treated individually.

Albuminuria of Pregnancy, and Eclampsia

Patients suffering from albuminuria of pregnancy are sometimes ordered a low protein diet in order to reduce the end products of nitrogen metabolism to be excreted. In the acute stages only fruit juices with plenty of glucose or lactose are usually given, followed later by a diet supplying about 30 grams of protein. This may be gradually increased by adding milk, eggs, and fish, according to the doctor's orders. Diets especially devised for this purpose are given on p. 198.

Other physicians consider that a diet with normal amounts of protein does no harm in the convalescent stages. What-

ever diet is prescribed it is most important to ensure that the patient is receiving an ample supply of calcium and iron to meet the demands of the growing fœtus. It may be necessary to prescribe these medicinally.

There is now good evidence that eclampsia is a preventable disease of nutritional origin and that it is very uncommon in communities which are adequately fed. It is, however, not yet certain what particular constituent of the diet is mainly responsible. Experimental work has shown that a deficiency of certain amino-acids may be important, but there is also a possibility that some member of the vitamin B complex may be involved. This all points to the need of a good diet during pregnancy, but, once the disease has declared itself, it is perhaps better to retain the classical treatment until we know for certain what deficiencies have to be made good.

ANURIA FOLLOWING CRUSH INJURY, MISMATCHED TRANSFUSION, ABORTION, OR INFECTION

It has been shown that these patients who may pass no urine for some days may be tided over the critical stages by giving them the right amount of water to make good their losses by the lungs and skin, adequate Calories in the form of sugar and fat, and no protein at all. The diet should be given by a continuous gastric drip. This contains 300–350 g. of glucose and 50–150 g. or arachis oil daily, to which are added concentrates of vitamins A, D, C, and the B complex. As the patient recovers and can tolerate food by mouth he or she should be given a diet providing at least 2,000 Calories a day but containing very little protein. Some of the protein should be of high biological value. A suggested arrangement is given on p. 199. As the level of blood urea comes down, more and more protein may be included. Recovery of kidney function is usually complete, and the patient is able after a month or two to take a normal diet again.

INJURY DUE TO BURNS

Moderate or severe injury by burning may lead to a considerable loss of protein from the body. This protein depletion is due to destruction of tissue at the site of injury, to loss of blood and serum from the wound, and to excessive nitrogen excretion in the urine. Two kilograms of protein may be lost during the first ten days after a third-degree burn, extending over 60 per cent. of the body surface and involving the whole thickness of skin. Dietary treatment, therefore, should be primarily directed to making good this loss. The patient should be encouraged to eat as much food rich in protein as he can, but he will probably not have much appetite during the first week, and the fortified milk mixture on p. 231 should form the basis of his diet. In convalescence a protein intake of about 150 g. a day should be aimed at. Milk, particularly skimmed milk, cheese, eggs, meat, and fish should all be given in liberal amounts. The high protein diet on p. 196 is suitable.

GOUT

Dietary treatment of gout consists in reducing the purine intake as far as possible. Foods specially forbidden are meat extracts, cellular organs, and whole cereals, including oatmeal and brown breads (see p. 202). The diet should be of a lacto-vegetarian type. Tea, coffee, and cocoa contain small amounts of substituted purines and are forbidden by some physicians. Alcohol is not allowed, as it is thought to be a predisposing factor. A suggested diet is given on p. 201.

RHEUMATISM

Whilst diet may be of considerable importance in the treatment of rheumatic diseases, its sphere of usefulness is limited, and is usually directed towards the improvement of

general health rather than towards the relief of the rheumatism itself. A sufficient intake of food essentials should be secured, with due regard to the maintenance or attainment of normal weight. If the patient is overweight, a reducing diet such as that shown on p. 119 should be given, and if underweight, a high calorie diet (p. 116) may be advisable. Constipation, hypochlorhydria, or anæmia should be treated with the appropriate diets.

CHAPTER IX

DIET IN DISTURBANCES OF MINERAL METABOLISM

LOW SALT DIETS

Diets low in sodium chloride, commonly known as low salt diets, are frequently of great value in cases of kidney and heart disease where much œdema is present. It is the absence of sodium from the diet which is important, and not necessarily the absence of chlorine. Low salt diets are, therefore, low sodium diets, and chlorides may be employed as salt substitutes. There are various preparations of salt substitutes now on the market, but since these usually contain sodium they should not be used without ascertaining their composition.

The average daily intake of sodium chloride by a normal healthy person is about 10 to 15 grams. It is impossible to construct a diet containing no sodium chloride at all, but by careful selection of foods, diets may be devised which contain not more than 0·1 gram of sodium chloride a day. If only a moderately low salt diet is required the choice of foods is far less restricted. A very low salt diet is not merely a diet in which foods are cooked without added salt, and the obviously salty foods, such as kippers and bacon, are excluded. A large number of foods, especially those of animal origin, meat, fish, cheese, milk, and eggs, which contain appreciable amounts of sodium chloride, should be entirely forbidden or strictly limited in the diet.

A low salt diet must consist to a large extent of fruit, and of vegetables cooked without added salt or soda. Salt-free bread must be used instead of ordinary bread, and salt-free butter should, of course, be given. Lists of foods allowed

and forbidden are given on p. 205. An adequate diet is difficult to arrange, since the protein-containing foods must be limited as they also contain sodium chloride. The greatest problem arises in the case of babies and young children whose food consists almost entirely of milk, and whose protein intake should be adequate for growth as well as for maintenance. For these a synthetic low salt milk has been devised which has proved useful in treating infants with œdema, and has also been used for older children and adults. The preparation of this milk is described on p. 260. The casein in the milk has a slight flavour, which can be completely disguised in coffee and puddings such as rice pudding, blancmange, milk jelly, and custard-powder custard. In order to add protein to the diet without additional sodium chloride, salt-free bread containing 19 per cent. of protein can be made with the addition of casein to the flour (for recipe, see p. 261).

Cakes made with ordinary baking powder must not be given, since the baking powder contains sodium. Yeast or a baking powder made from calcium carbonate $2\frac{3}{4}$ parts, tartaric acid 2 parts may, however, be used for scones, buns, etc. Shortbread biscuits made from flour, salt-free butter, and sugar are allowed.

It has been found by experience that the foods appreciated by patients on low salt diets are foods which are not normally eaten with salt. Sweet foods, fruit (raw or stewed), jam, marmalade, honey, are usually preferred to saltless savouries. Raw tomatoes with pepper are sometimes appreciated, also mushrooms and onions fried in olive oil. Vegetables may be mashed with low salt butter. No gravy of any kind should be given, but various kinds of pepper add flavour to tasteless dishes.

Boiled sweets, barley sugar, and toffee prepared from low salt butter, golden syrup, and sugar provide a little variety.

Typical examples of a strictly low salt diet, and one which is less restricted, are given on p. 203. The sodium

chloride contents of these diets are 0·1 gram and 0·5 gram respectively.

DIETS IN ANÆMIA

Investigations of the past twenty years have demonstrated the great importance of nutritional factors in blood formation. Both the number and quality of the red blood cells depend to a large extent on the amount of iron, perhaps also of copper, and of protein in the food and on the efficiency of the liver and digestive tract. Nutritional anæmias are due to a deficiency of one or other of the factors essential for blood formation.

Anæmia due to iron deficiency. A deficiency of iron may result from at least three causes:

1. The consumption of a diet poor in iron-containing foods.
2. Defective absorption and utilisation of iron from the digestive tract.
3. Increased demands of the body for iron, due to blood loss, rapid growth, pregnancy, or infection.

Dietary treatment of this type of anæmia, whatever its cause, is always the same, and consists in increasing the iron intake. If the anæmia is severe, dietetic measures alone may be insufficient, and medicinal iron should be given as well. Foods rich in iron should be given in any case, so as to re-establish the habit of taking sufficient iron for the patient's normal requirements and thus help to prevent a recurrence. These consist mainly of meat, eggs, brown bread, and green-leaf vegetables. Black treacle and oatmeal are also good and cheap sources of iron. Copper, which is thought to be essential for hæmoglobin regeneration also occurs in those foods which contain a plentiful supply of iron.

It has been found that in more than 80 per cent. of women with nutritional anæmia hypochlorhydria is also present. If the gastric juice is deficient in hydrochloric acid the iron tends to be precipitated in the stomach, and

certainly does not remain in solution long enough to be absorbed in the intestine. These patients should receive dietary treatment for hypochlorhydria, as well as for anæmia (see p. 135).

If the recent work on phosphate–iron relationships is substantiated, the treatment of refractory anæmias by low phosphorus diets may turn out to be valuable, but this is likely to have a simpler and more fashionable competitor in the new preparations of iron which can be given in therapeutic amounts intravenously.

Pernicious anæmia. The treatment of pernicious anæmia by diet is only of historical interest. It was once necessary to prescribe large quantities of liver, and later minced hog's stomach became an alternative. The preparation of active liver concentrates, and the isolation of folic acid and vitamin B_{12} have made all this unnecessary, and treatment is now entirely medicinal.

DIETARY TREATMENT OF LEAD POISONING

Lead once taken into the body is excreted only slowly and with difficulty, and it is the presence of lead in the blood which causes the symptoms of lead poisoning. Dietary treatment consists in giving a high calcium diet with adequate amounts of vitamin D. This encourages bone calcification and the lead in the blood stream is transferred to the bones along with the calcium. So long as the high calcium diet is continued the lead remains in the bones in an inert and harmless form and the symptoms of lead poisoning disappear. The diet should contain plenty of cheese, milk, and green vegetables.

An older treatment consisted of alternate periods of low and high calcium intakes, the low intake being combined with parathyroid therapy with the object of producing a negative calcium balance. Some of the lead was removed from the bones together with the calcium and some of this

was excreted. This part of the treatment often gave the patient further symptoms of lead poisoning, since lead was set free into the blood again. It was then necessary to give a high calcium diet for a time to transfer the lead from the blood into the bones once more, and to re-establish calcium equilibrium. The procedure was then repeated. A low calcium diet suitable for this type of treatment is shown on p. 206, since it may come to the fore again now that B.A.L. (British Anti-Lewisite) is available. This substance combines with lead to form a soluble compound which is non-toxic and is easily excreted by the kidney.

DIETS FOR CALCIUM BALANCE EXPERIMENTS

These experiments are not a method of treatment but are used as a means of diagnosis or for following the effects of treatment. At one time they were largely used to distinguish between various types of bone disease, particularly if a parathyroid tumour was suspected. In normal health, on a low calcium diet (about 100 mg. a day), and when the urine is kept neutral or just alkaline, three-quarters of the calcium taken in the food is excreted in the fæces and the remaining quarter in the urine. In cases of parathyroid tumour the amount excreted in the fæces may be unchanged, but the amount excreted in the urine is greatly increased, and may be four times the amount excreted in the fæces.

Calcium balances are most likely to be of value to-day in the investigation and treatment of obscure bone diseases in adults, cases of resistant rickets, sprue, etc. For this purpose the patient's calcium balance should first be studied on his usual diet and while taking his usual amounts of calcium, since altering the calcium intake may upset a person's calcium equilibrium for several weeks. The result of this test tells whether the patient is still losing calcium or not, *i.e.* whether the disease is still active. The diet may then be

changed, or treatment with vitamin D may be instituted. A second calcium balance some weeks later will tell whether treatment is being effective, and how effective it is, long before any changes in the X-ray appearances of the bones are likely to be seen.

Calcium balances are useful in any patient who is being treated with very large doses of vitamin D, because they show when the deposition of calcium is slowing down as the bones become normal. In this way the possibility of giving too much vitamin D can be avoided.

If an accurate balance of intake and output of calcium is required, the diet must be prepared, weighed, and consumed with a degree of accuracy unnecessary in therapeutic treatment. It is always best to set aside a duplicate portion of all food for chemical analysis. Scales or a spring balance weighing to 1 gram should be used. Foods rich in calcium such as milk must be measured with particular care, and a glass measuring cylinder or a pipette is most suitable for this purpose. It is advisable to omit cheese and fish with small bones such as herrings and sardines from the diet altogether because of the error introduced by even a slight inaccuracy in weighing or sampling. In taking the samples for analysis it is very important to be sure that the sample analysed is exactly similar to the portion that was eaten. Green vegetables must be cut up before they are served so that the patient's portion and the sample for analysis contain the same proportion of inside and outside leaves. Pure sodium chloride should be used instead of ordinary table salt. Where there is an appreciable amount of calcium in the tap water, as in London, distilled water must always be used for drinking purposes, for tea or coffee, and even for tooth cleaning. The use of tooth paste or powder must be avoided during a calcium balance experiment since these usually contain precipitated chalk.

TREATMENT OF CHRONIC HYPOPARATHYROIDISM AND RENAL RICKETS WITH LOW PHOSPHORUS DIETS

During operations on the thyroid gland the parathyroid glands are occasionally inadvertently removed. This gives rise to parathyroid deficiency, a condition which may also appear spontaneously. In either case the serum calcium falls far below its normal level. The acute symptoms of tetany which result are readily relieved by intravenous injection of calcium with or without simultaneous injections of parathormone. Once the parathyroids have been removed, however, they cannot be replaced, and some form of permanent treatment is necessary to maintain the calcium in the blood at a normal level. It has been found that a low phosphorus diet in conjunction with large doses of calcium lactate are extremely beneficial in such cases. The suggested optimal level of phosphorus intake is from 0·5 to 0·65 gram a day. The calcium intake should be 2 grams. A small proportion of this will come from the food, but this should be supplemented with 14 grams calcium lactate daily. A suitable low phosphorus diet is shown on p. 207.

Renal rickets, a disease which is seen most often in children, is primarily a disorder of the kidneys in which phosphorus is not excreted normally. The level of phosphorus in the blood is very high, and there is a reciprocal reduction in serum calcium. This abnormal calcium–phosphorus ratio leads to decalcification of the bones. A low phosphorus diet such as that shown on p. 207 may be of some benefit in this disease, supplemented with calcium lactate, so that the calcium intake is at least 2 grams daily.

TREATMENT OF ADDISON'S DISEASE WITH LOW POTASSIUM DIETS

Addison's disease is the result of gradual atrophy or destruction of the suprarenal gland. It is characterised by

weakness, prostration, vomiting, and sometimes collapse. The patients generally have very low blood pressures. They also have a lowered renal threshold for sodium and frequently a raised serum potassium. They are usually treated by sodium chloride, which is generally taken in capsules, and they are given about 15 grams a day. It is often necessary to supplement this by injecting cortin, an extract of the suprarenal glands, or by implanting pellets of desoxycorticosterone under the skin. It has been shown, however, that such patients derive great benefit from a low potassium diet, and that the amount of the hormone may then be considerably reduced or become unnecessary.

A low potassium diet is given on p. 208, and a table showing amounts of food containing 0·05 gram potassium is given on p. 209. From this alternative diets may readily be calculated.

It will be seen that lean meat and vegetables in general have the highest content, whilst fats, sugars, and starches such as cornflour and tapioca have the lowest. By cutting meat or vegetables rather finely, and cooking them in a large volume of water, the amount of potassium can be reduced, and larger portions can therefore be taken by patients on low potassium diets. This treatment, however, tends to spoil the flavour, especially of meat, unless it is cooked in special parchment paper. Meat or vegetables cut in small dice should be placed in the centre of a square of the paper, then tied up with clean, fine string, placed in a large saucepan or casserole of water, and cooked until tender. Salt and pepper can be used for seasoning. Ordinary gravy should not be used, as it contains a good deal of potassium from the meat, but a special recipe is given on p. 264.

In calculating the diet, great care should be taken that it is adequate in all respects. It is very easy in a zeal for reducing potassium to make it deficient in protein, Calories, or the vitamin B complex. The patient's condition and appetite must be the first consideration, and the amounts of

food taken may have to be small at first, but with improvement in health a satisfactory and varied diet should be easy to devise; fats, sugars, and low potassium starchy foods must be used to make up Calories, and it is desirable to give a vitamin B concentrate regularly.

CHAPTER X

DIETS FOR JEWISH PATIENTS

DIFFICULTIES sometimes arise because doctors or dietitians do not know what foods are allowed for Jewish patients who keep to their traditional and religious rites. These are comparatively simple, and almost any diet can be arranged to conform to them. All raw or cooked foods are allowed so long as they conform with the following regulations.

1. Meat and fowl must be killed by experts approved by the ecclesiastical authorities and must be prepared according to Jewish law. This preparation includes washing and salting for certain specified periods. It is then called *kosher* (meaning " ritually fit ").

2. Orthodox Jews will not take milk less than six hours after eating meat, but as no definite interval has been fixed by the Rabbis, many Jews would regard three hours as sufficient. Milk pudding, therefore, may not be taken after meat, but should be served after fish, while stewed fruit, pastry made with vegetable margarine, suet pudding, etc., are eaten after meat. Milk foods may be taken before meat, provided the hands are washed and the mouth rinsed after the milk food. Separate cooking utensils, crockery, and cutlery must be used for meat and for milk. Glass may be used for either if it is first rinsed with hot water.

According to Jewish law, doctor's orders must be obeyed, even if they are contrary to Jewish ordinances normally observed. If the physician considers any forbidden food, or arrangement of foods, to be necessary for a patient's health, he will have the full support of Jewish religious opinion in overriding any prejudices the patient may have. Difficulty may arise because patients, when ill, become superstitious about eating " unclean " foods. There is the added

difficulty of persuading people to take, when ill, food that they have neither tasted nor wanted whilst they were well.

Only animals which " cleave the hoof and chew the cud," and are killed in a special way, and fish with scales and fins are allowed according to the Mosaic law. All kinds of fowl except birds of prey are permitted, but only if killed in accordance with Jewish ritual. Game that is shot is, therefore, not permitted, and it is called *trefah* (meaning " ritually unfit "). Rabbit also is considered unclean for the same reason.

Short lists of *kosher* and *trefah* foods are given below.

ALLOWED (*Kosher*)

Beef
Veal
Mutton
Lamb
Chicken
Duck
Goose
Turkey
All salt and fresh-water fish apart from shell fish and eels

FORBIDDEN (*Trefah*)

Pork
Bacon
Ham
Rabbit
Hare

All shell fish such as—
Oysters
Crab
Lobster
Shrimps
Eels

Eggs with blood spots
Gelatine, unless specially prepared (*e.g.* British Agar or Vegeloid extracted from seaweed).

Jewish Holidays : Special Food Customs

Special foods and dishes are eaten at most Jewish holidays in the same way that Christmas pudding is eaten at Christmas. The festivals are made an occasion for special delica-

cies, and there is the risk that those who are too stout or suffer from a delicate digestion may eat too much.

Passover. Food at Passover, which falls about Easter time, is modified by the biblical ordinance which forbids the eating of leaven for a week, in remembrance of the exodus of the Children of Israel from Egypt. Ordinary bread can therefore not be eaten, and large unleavened water biscuits known as *matzos* or Passover cakes are used instead. Their food value is similar to that of other unsweetened biscuits, and they can be used on weighed diets for diabetics, *e.g.* by substituting $\frac{3}{4}$ oz. of matzo for every ounce of bread.

Day of Atonement. This day, which falls in the autumn, is observed as a fast by Jews. If a doctor considered fasting undesirable for considerations of health it would be contrary to the tenets of the Jewish religion for a patient to fast. Thus, doctors prescribing diets for Jewish patients should be particularly careful that those suffering or recovering from gastric or duodenal ulcers do not fast, and that diabetics receiving insulin continue this treatment and take at any rate their usual quantities of carbohydrate on the Day of Atonement.

The Jewish Cookbook (Greenberg) will be found useful by those requiring details of recipes commonly used by orthodox Jews.

CHAPTER XI

FOOD TABLES: THEIR PREPARATION AND USE

THE HISTORY OF FOOD ANALYSIS

THE composition of foods and their division into various classes is a subject which has interested many workers, even from the time of Hippocrates. It was necessary, however, for the science of chemistry to be fairly far advanced before any great progress could be made in the chemical analysis of foodstuffs. Liebig, who worked at the beginning of the last century, was one of the founders of organic chemistry, and he was one of the first to apply chemical methods to the investigation of plant and animal foods. He expressed his results in terms of nitrogen and carbon, and not as protein, fat, and carbohydrate as we do to-day, though he was aware that these are the three prime necessities in animal nutrition, and he knew that the proteins are the carriers of nitrogen.

A good deal had been written about diet before 1800, but it was philosophical rather than scientific, and the publication of Forsyth's *Dictionary of Diet* in 1834 marked the beginning of a scientific approach to the subject. Paris's *Treatise on Diet*, published in 1837, is the first book dealing with the subject along modern lines. He classified foods into fibrinous (*e.g.* flesh), albuminous (*e.g.* eggs), farinaceous (*e.g.* flour), and so on. In 1843 a book called *Treatise on Food and Diet* was brought out by Jonathan Pereira which classified the alimentary principles as the aqueous, the mucilaginous, the saccharine, etc. An analysis of many foods is also given, sometimes in terms of carbon and nitrogen, and sometimes in terms of these alimentary principles. His figures for the composition of milk—casein, 4·2 per cent.; butter, 3 per cent.; sugar, 5·3 per cent.; and salt, 0·75 per cent.—

are not so very different from the figures which we accept and use to-day.

By 1870 the analysis of foods for nitrogen and carbon, and later for carbohydrate and fat, was being correlated with the physiology of nutrition by Rubner and Voit in Germany and Atwater and Lusk in America. The calorific value of foods was investigated *in vitro* and *in vivo*, and the conception of food as the basis of energy was firmly established. The earliest investigator to publish comprehensive food tables appears to have been König in Germany. His tables, which were published in 1882, were a compilation from his own and other people's analyses. All the domestic animals with their internal organs, fish, milk, cheese, eggs, etc., had been analysed by reliable methods for proteins, fats, total ash, and water. The nineteenth century closed with the publication in America of Atwater and Bryant's analytical masterpiece. This included figures for the water, protein, fat, carbohydrate, ash, and calorie value of over 4,000 samples of American food materials, and many workers, particularly in America, still use these tables to-day.

Up to the time of the 1914–18 war little was done in this country, but the shortage of food in 1917–18 prompted the War Office to sponsor an investigation of English foods. This work was undertaken by Plimmer and his report was published in 1921. All common British foods were investigated. The amount of refuse was determined, and the edible portions were analysed for protein, fat, and carbohydrate, from which the energy values of the foods were calculated. Total ash was determined and also chloride.

Almost before these tables were published the whole outlook on nutritional problems had changed. Rickets had just been recognised as a deficiency disease, and this drew attention to other aspects of the disease, and analyses of foods for calcium and phosphorus began to be made. Later, interest in the anæmias inspired iron determinations, also estimations of copper.

The discovery of the importance of vitamins in nutrition led to the search for methods of assaying vitamins in food material and a considerable amount of work has been done on this subject. Even at the present time, however, the data are very incomplete, and for many foods the values given by different workers are very different from one another. This is probably partly because the concentrations of vitamins tend to vary more than those of other dietary constituents, but also because the methods of estimation used by some workers still leave much to be desired.

THE PREPARATION OF FOOD TABLES

The analysis of foods is laborious work, and the value of the results depends almost entirely upon the reliability of the chemical methods employed and the number of samples analysed.

A comparison of the figures for the carbohydrate content of fruits and vegetables given in different food tables sometimes reveals rather alarming variations owing to differences in technique. Atwater and Bryant determined carbohydrate " by difference," that is, they estimated the protein, fat, and water, and the remainder was assumed to be carbohydrate. This included a great deal of the unavailable cell wall material in the so-called " carbohydrate " fraction. To-day there are chemical methods which will determine not only the total carbohydrate in a food which is available to the human body but which will estimate separately the various kinds of carbohydrate, the starch, cane sugar, glucose, fructose, and so on. The sum of these constitutes the available carbohydrate in the food. Figures given in this book for the carbohydrate in foods have been derived by this last method. In America figures for carbohydrate " by difference " are still generally employed.

The *protein* content of a food is usually obtained by estimating its total nitrogen and multiplying this figure by a

factor—6·25. It is known that a pure protein usually contains about 16 per cent. of nitrogen. Therefore 1 gram of nitrogen corresponds to $\frac{100}{16}$ grams of protein, *i.e.* 6·25. We now know, however, that the nitrogen of many foods is not all present as protein nitrogen—one-half or even more may be present in other forms, and these other forms may or may not be available to the body for energy or for tissue repair. Furthermore, 6·25 is an average factor and is not the correct one for some individual proteins. The nitrogen in cereals should be multiplied by 5·7 and that in milk by 6·36 to give the amount of protein in these particular foods. It would be far better if diets could be constructed in terms of nitrogen, and not in terms of protein as they are at present. This may not matter so much in the treatment of patients, but in research work the advantages of expressing nitrogen as such are obvious.

The *fat* content of foods is comparatively easy to estimate, and the results obtained by various workers are fairly consistent.

Water is usually estimated by drying to constant weight at the highest temperature that will not cause any decomposition of the food. Many foods can be dried at 100 deg. C., but fruits, for example, cannot be heated so strongly or the fructose in them will char.

From the percentage of carbohydrate, protein, and fat in a food the calorie value of that food can be calculated (see p. 3). Various other organic constituents of foods are occasionally determined for special reasons. Purines, for instance, are of interest in cases of gout. It is sometimes desirable to know the acidity of fruits, and the amount of alcohol in beverages may be of great importance.

Analyses of foods for their individual minerals have only been carried out to any great extent during the last thirty years. The accurate chemical estimation in foods of such elements as sodium, calcium, magnesium, iron, and copper requires experience, and unless reliable methods are used the

results are valueless. Numbers of workers have analysed a variety of foods for one special element, *e.g.* iron, and others have analysed one special food for a number of elements. These results are scattered in scientific periodicals published in almost every country in the world. Sherman's tables, published in *The Chemistry of Food and Nutrition*, were at one time the most complete information we had on the subject. His figures, however, were in most cases derived from an analysis of raw foodstuff. It is obvious that for such foods as meat and vegetables the composition of the cooked food is usually of greater importance for human nutrition than its composition in the raw state. Losses occur during cooking and changes in weight take place. Meat, for instance, may lose nearly half its weight when cooked. This loss is largely due to the fact that when meat is heated it invariably shrinks, and as the tissues contract they squeeze out the meat juices which consist of a watery solution of extractives and mineral salts. In dry methods of cookery, such as roasting, shrinkage goes on as above, but the loss of weight is nearly all due to loss of water through evaporation. The loss of salts is small because as the water evaporates from the expressed juices the salts are left on the surface of the meat. In wet methods of cooking, such as stewing, there is a second source of loss—the salts soak out into the surrounding water and increase the loss due to shrinkage. In practice the losses do not matter since meat gravies are usually eaten. Similar losses occur, however, when fish is cooked, and fish gravies are usually discarded. McCance and Shipp have carried out an extensive study of the chemical composition of flesh foods cooked in various ways, and their tables give values for the minerals as well as for the protein and fat of many varieties of fish and meat.

Vegetables and fruits are unlike meat and fish in that they do not shrink when cooked and very little loss in weight takes place. Loss of minerals and other soluble constituents such as sugars does occur, however, when vegetables are boiled in

water, and the composition of the cooked food is of more importance than the composition of the raw. For foods which are generally eaten cooked the figures given in the tables of food composition on pp. 269–293 refer to the cooked food. Foods which are usually eaten raw have been analysed in the raw state; and values are shown both for the raw and cooked food where it seemed appropriate to do so.

The proportion of a foodstuff which is discarded as waste is another important factor in food analysis. In America the expressions AP (as purchased) and EP (edible portion) have been adopted to signify whether the figures given for the composition of the food refer to the raw purchased weight or to the weight of the food as eaten.

In using any food tables it must be remembered that foodstuffs are not like pure chemical substances. They have no constant chemical composition. The composition of an apple, for instance, depends on the variety, on the degree of maturity, on the soil upon which it was grown, on the dryness of the season, on the time it has been stored, and so on. The composition of a piece of beef depends upon the condition of the animal when it was killed, and upon the way in which the meat has been cooked. Any figures given in food tables for the composition of a foodstuff are only *average* figures. For general purposes analyses based on a large number of samples are what are wanted, since they will approximate best to the composition of the food of a number of persons over a period of time. When the balance of an individual's intake and output of a dietary constituent such as nitrogen or calcium is being measured, however, it is always preferable to take a portion of his actual diet for analysis.

The following example will make clear the general processes involved in the preparation of foods for analysis.

Twelve 1-lb. batches of potatoes of several varieties which were grown in different parts of the country were bought, washed, and weighed. They were then peeled by hand in

the ordinary way, and the peelings weighed in order to obtain the percentage waste. The weighed, peeled potatoes were boiled in distilled water in the usual manner (no salt was added), and when cooked they were strained and weighed immediately. They were allowed to cool and weighed again. After being mashed, the different batches were well mixed, and portions were weighed out for the estimation of the various constituents. Sugars, starch, and cellulose (" roughage ") were estimated on one sample of the mixture, total solids, nitrogen, and phosphorus on another, chlorine on a third, while a fourth was ashed by heating it strongly in a furnace prior to the determination of sodium, potassium, calcium, magnesium, iron, and copper.

The fat content of fruit and vegetables is negligible, but for foods which contain fat another sample was set aside for this estimation.

All samples were weighed out in duplicate, and the final results were calculated back to the composition of the hot potato as served.

THE USE OF FOOD TABLES

Food tables, that is tables showing the chemical composition of foodstuffs, are used for many purposes. In hospital diet kitchens abridged food tables giving the protein, fat, and carbohydrate content of foodstuffs commonly in use in that particular institution are usually employed, but more complete tables are continually required for reference. Some form of ready reckoner is valuable for the more common foodstuffs, and this is given in Table III. In some cases only one or two dietary constituents are of interest, *e.g.* protein in high or low protein diets, fat in low fat diets, sodium chloride in low salt diets, and calcium in calcium balance experiments. Sometimes it is the calorie value which is of primary importance, as in reducing diets. On other occasions a complete analysis of the food is needed.

In most hospital work it is the composition of the *edible*,

cooked portion of the food that is of interest. The composition of a raw cod does not matter, but the composition of the cooked fish as served to the patient is required. Hospitals, therefore, need tables of analyses of foods as served as well as of foods as purchased.

Again, in the care of patients, the physician, nurse, or dietitian is dealing with *individual* diets, where the weights of the portions of food are relatively small—the composition of an ounce of bread is of far more use to them than that of a pound. The tables given in Chapter XIV, which are intended primarily for calculating individual diets, show the composition of 1 oz. of the edible portion of a number of foodstuffs, both raw and cooked.

In institutions such as boarding schools, colleges, children's homes, and hospitals, where the diet supplied is calculated to meet the nutritional requirements of the individuals receiving it, these tables should also prove useful. For specific purposes it is sometimes more practicable to design special tables; the Ministry of Education, for example, has issued tables in a form suitable for helping those who are responsible for school meals.

Food tables are also essential for dietary surveys. A dietary survey may be carried out on groups of people or on individuals living either in an institution or in their own homes. If groups are being studied the most frequent method is to examine and weigh all the food coming into the house or institution over a given period of time. For this method it is not the analysis of the cooked, edible portion of the food that is required, but the amounts of the various constituents that would be obtained from the food as purchased. For dietary studies of individuals all the food eaten by each individual at each meal is weighed, so here tables giving the composition of small quantities of foods as eaten are required.

Among other uses of food analyses may be mentioned the planning of import and export policy and the arrangement

of suitable rations for populations in times of shortage. Ration scales for the Army, Navy, and Air Force are drawn up with reference to the chemical composition and particularly the calorific value of the different foodstuffs, as are also those for explorers, climbers, and others who are forced to carry with them sufficient food in concentrated form to last them often for many months. The whole success of an expedition may depend upon the choice of the food. It must supply the calorie, mineral, and vitamin requirements of the individuals for a considerable period of time in as concentrated a form as possible. It is tragic to read of the unnecessary sufferings of the members of Scott's last expedition, who developed scurvy simply because no foods containing adequate amounts of vitamin C had been included in their rations.

CHAPTER XII

DIETS

In this chapter sample diets suitable for the various disorders discussed in Chapters IV to XI are given, together with lists of foods allowed and forbidden, and dishes suggested. In practice many changes and additions may be made and the diets varied to suit the taste of the patient and the time and capacity of the cook. Careful attention must always be paid to ensure that patients requiring special diets receive adequate amounts of all the food essentials.

Special recipes are given in Chapter XIII for some of the dishes suggested when ordinary recipes are unsuitable. In this case the page on which the recipe may be found is indicated. Otherwise ordinary recipes should be used.

In all diets and recipes where milk and eggs are mentioned, dried milk and egg powder may be substituted. Similarly, vitaminised margarine may be used instead of butter without affecting the food value.

In the menus, meatless alternatives are given for the convenience of those who do not wish to take meat on Fridays. The diets and menus may also be readily adapted for orthodox Jewish patients in accordance with the note on p. 103.

HIGH CALORIE DIETS

Suitable for:— PAGE

Convalescence after fever 59

Fractures (1st week) 60
(Plenty of protein foods: meat, fish, cheese, milk, and eggs should be given.)

Graves' Disease 49

Tuberculosis 60
(2 pints of milk should be taken daily. If the patient cannot take solid food, the 2,500 Calorie fluid diet (p. 131) may be used.)

Underweight 49

Undernutrition due to restricted food intake 49

Breakfast.
Porridge or cereal with milk and sugar to taste.
Bacon, kipper, herring, bloater, or fried fish, or egg, boiled, poached, scrambled, fried, or as omelette, or fried tomatoes on fried bread.
Bread or toast with butter or margarine and marmalade, jam, honey, or syrup.
Tea or coffee with milk and sugar to taste.
Fruit, fresh or stewed, with sugar if desired.

Mid-morning.
High calorie drink (p. 231) or high calorie lemonade (p. 232).
Two sweetened biscuits, cream crackers, or bread and butter.

Dinner.
Thick soup or sugared grapefruit.
Meat or fish (good serving) with thick gravy or sauce.
Potatoes and other vegetables with margarine, or salad with mayonnaise.
Cereal milk pudding with sugar or other high calorie pudding (see list).

Tea.
Bread with butter or margarine.
Jam, or meat or fish paste.
Cake or sweet biscuits or shortbread if desired.
Tea with milk and sugar to taste.

Supper.
As dinner, or cheese, egg, or fish dish with bread, toast, or biscuits and butter.
Cocoa or other milky drink with sugar to taste.

Bedtime.
As mid-morning.

Note on High Calorie Diets

Glucose, lactose, or ordinary sugar should be added to beverages, fruits, puddings, porridge, etc., whenever possible. Some raw

fruit or fresh fruit drink should be taken daily. Fat, butter, margarine, cream, etc., should be used generously, as long as they do not spoil the appetite.

SUITABLE DISHES FOR HIGH CALORIE DIETS

Note.—The following suggestions for high calorie dishes are given for convenience. Patients who dislike or cannot tolerate foods cooked with fat should take as much glucose as possible with their puddings and beverages, and take extra butter and margarine whenever they can.

Soups.	Thick soups of any kind, including meat, ox-tail or mulligatawny soup. Cream soups, such as chicken (p. 232), potato, celery, tomato, artichoke. Tomato soup with lactose (p. 232). Margarine, butter, or cream and fried croutons should be used wherever possible.
Eggs.	Fried eggs and bacon, omelettes with or without ham, scrambled eggs.
Fish.	Fried fish or fish cakes, grilled fish, fish baked in fat. All fat fish. Fish with mayonnaise or Hollandaise sauce. Creamed fish. Fish au gratin. Fish soufflé with cream.
Meat.	Fried cutlets, fried croquettes. Ham with salad and mayonnaise. Boiled ham, sauce Madère. Ham mousse. Meat pies and puddings. Meat stews with dumplings. Roast pork or other fat meat. Mixed grill. Liver and bacon.
Puddings.	Pudding or stewed fruit with at least 1 oz. of glucose, lactose or cream per portion. Suet puddings. Steamed puddings with syrup, jam, etc. Pastry. Compôte of fruit (p. 235). Pain Perdu (p. 235). Ice cream (p. 231). Jam omelette (p. 221).
Savouries.	Angels on horseback. Cheese straws. Grilled tomatoes on toast. Fried bacon and tomatoes or potatoes. Roes on toast.

Beverages. High calorie diets depend to a great extent on beverages which can be consumed with or between meals without giving the patient a feeling of satiety. The following are examples of suitable beverages :

Lemonade (p. 232).
Orangeade (p. 232).
Coffee (p. 231).
Cocoa (p. 231).
Treacle egg nog (p. 231).
Vanilla egg nog (p. 231).
Milk and cream (p. 231).
Fortified milk mixture (p. 231).

LOW CALORIE DIETS

Suitable for:— PAGE

Enforced lack of exercise owing to:—

Fractures (after the first week) 61
Heart disease 51
Old age 48
Rheumatism 92

Obesity due to:—

Endocrine disturbances 51
Overeating 51
Menopause 51

LOW CALORIE DIET (1,000 Cals.)

(Approximate composition: Carbohydrate, 100 g.; Protein, 50 g.; Fat, 50 g.; Calories, 1,050.)

Breakfast.
One egg boiled or poached, or smoked haddock, steamed white fish or grilled lean rasher of bacon.
Bread, one thin slice (approx. 1 oz.).
Butter from allowance.
Tea or coffee (ground) with milk from allowance. No sugar.

Mid-morning.
Meat or yeast extract.
One plain biscuit, or fresh fruit containing 5 g. carbohydrate (see p. 188).

Dinner.
Clear soup if desired.
Lean meat, rabbit, chicken, or steamed fish, medium portion.
Gravy without fat or thickening.
Green leaf vegetables as desired (see food list, p. 122).
Fruit, fresh or stewed without sugar, containing 10 g. carbohydrate (p. 192), or two plain biscuits, or orange or fruit jelly (two portions, pp. 252, 253).

Tea.
Bread, two thin slices (approx. 2 oz.).
Salad as desired, or yeast extract.
Butter from allowance.
Tea with milk from allowance (no sugar).

Supper.
Cheese, sardine, salmon, herring, or kipper, small portion, or
White fish or smoked haddock, medium portion, or
Bulky salad or savoury dish providing about 80 Cals. (see p. 238).
Bread, one thin slice or two plain biscuits or ¾ oz. Ryvita or Vitaweat.

Fruit, fresh, or stewed without sugar, containing 10 g. carbohydrate.
Tea or coffee (ground) with milk from allowance.

Daily allowances: Butter, ¾ oz.
Milk, ½ pint.

LOW CALORIE DIET (1,200 Cals.)

Add ¼ oz. butter or margarine and 2 oz. bread, or 1 oz. bread and 3 oz. potatoes daily to the above diet.

Note on Low Calorie Diets.

The amounts of food allowed in the above menus must not be exceeded but they may be arranged to taste.

If Calories are to be further reduced, butter may be omitted entirely. A concentrate of vitamins A and D should be prescribed.

For 400 Calorie diet, see p. 52.

LOW CALORIE DIET FOR CHILDREN

(Approximate composition: Carbohydrate, 140 g.; Protein, 70 g.; Fat, 40 g.; Calories, 1,200.)

Breakfast.
Skimmed milk from allowance with dash of tea but no sugar.
One egg, boiled or poached, or steamed white fish, or grilled lean rasher of bacon.
Bread, one thin slice (approx. 1 oz.).
Butter from allowance.

Mid-morning.
Skimmed milk from allowance and one plain biscuit, or
Fresh fruit containing 5 g. carbohydrate (p. 188).

Dinner.
Lean meat, rabbit, chicken, or steamed fish, medium portion.
Green leaf vegetables as much as desired or small serving root vegetables.
4 oz. potato boiled or mashed.
Fruit, fresh or stewed, containing 10 g. carbohydrate (p. 192).

Tea.
Medium portion of cheese, or steamed fish, or one egg.
Bread, two thin slices (approx. 2 oz.) with butter from allowance.
Salad as desired.
Fruit containing 10 g. carbohydrate, or two plain biscuits, or orange or fruit jelly (two portions, pp. 252, 253).
Skimmed milk from allowance, flavoured with tea if desired. No sugar.

Bedtime.
Skimmed milk from allowance plus small teaspoonful Ovaltine or Bournvita, if desired, or skimmed milk jelly or junket (p. 248).
Bread, one thin slice (1 oz.) with butter or margarine from allowance.

Daily allowances: Butter, ¾ oz.
Skimmed milk, 1¼ pints.

Concentrates containing vitamins A, D, and the B complex should be given with this diet.

BLAND LOW CALORIE DIET FOR PATIENTS WITH DISEASE OF THE HEART

Breakfast.
One egg, boiled or poached, or one rasher grilled lean bacon, or steamed white fish.
Bread, two thin slices.
Tea or coffee (ground), one small breakfast cup.
Milk to taste (no sugar or sweetened condensed milk).

Mid-morning.
Fruit, such as grapes, oranges, plums, or pears, or
One unsweetened biscuit.
One teacupful of tea or coffee with a little milk if desired. No sugar.

Dinner (may be taken in the evening if preferred).
Meat (lean and tender), chicken, rabbit, or steamed or boiled fish, medium portion.
Cauliflower or Brussels sprouts in small amounts only.
Raw fruit as mid-morning, or baked apple or fresh fruit stewed without sugar or custard or other pudding containing 5 g. carbohydrate (pp. 188, 251).
Half a glass of water or unsugared lemon water, if desired.

Tea.
One slice of bread or one plain scone or two unsweetened biscuits.
Tea, one or two teacups.
Milk to taste. No sugar.

Supper or Lunch.
One egg, boiled or poached, or white fish or smoked haddock, moderate helping, or
Cheese (fresh milk), small helping.
One slice of bread.
Fruit as for lunch.
Half a glass of water or unsweetened lemonade if desired.

Bedtime.
Teacupful of skimmed milk with a little Ovaltine or Bournvita if desired, or unsweetened orange juice or lemon water and one unsweetened biscuit.

Butter must not exceed ¾ oz. in the day.

Patients suffering from heart disease must take small, easily digested meals. They should therefore limit the quantity of all food which they take at one time, including those listed below as allowed without special restriction. Low calorie beverages may be taken between meals.

If salt is restricted, no salt should be used in cooking, and no salt served at table. For Food List for Low Salt Diets see p. 205.

FOOD LIST FOR LOW CALORIE DIETS

	Allowed in moderation	Forbidden
Bread, biscuits, cereal foods, etc.	None.	Pastry, cakes. Puddings of all kinds, including Yorkshire pudding. Suet dumplings, crust, and pudding. Barley, rice, tapioca, macaroni, spaghetti, vermicelli and similar cereals. *N.B.*—Bread or unsweetened biscuits may only be taken as allowed in the diet. A small amount of porridge or cooked cereal may be substituted for bread at breakfast or supper if desired. These are not allowed as extras in the diets.
Dairy products.	Skimmed milk. Skimmed milk cheese.	Cream. Butter and margarine, except small amount allowed in diet. Whole milk, fresh or condensed, beyond amount allowed in diet. Sweetened condensed milk. Ice creams and ices.
Meat and fish.	Lean meat. Steamed or boiled white fish, and smoked haddock.	Fat meats, such as ham, bacon, pork and sausages, and the fat of any meat, lard, and dripping unless used in place of butter allowance. All fried meat and fish dishes.

	Allowed in moderation	Forbidden
Fruit and nuts.	Raw fruits, except bananas which should be taken in small quantities only.	Dried fruits, stewed or preserved, fruits tinned or stewed with sugar. All nuts.
Vegetables.	Green-leaf vegetables marrow, cauliflower, celery, asparagus, French and runner beans. Salads of all kinds. Tomatoes, raw, stewed, or baked without fat (p. 245). Small portions of root vegetables (not potatoes).	Potatoes (except as allowed in the diet), dried peas, beans, and lentils. All fried vegetables.
Beverages and soups.	Tea and coffee (ground). Lemon juice with water or soda water (no sugar). Bottled fruit juices (no sugar). Soda water.	Mineral waters (except soda water), ginger ale, ginger beer, bottled fruit juices (sugared), such as grape fruit and lemon juice. Alcoholic beverages, especially beer, stout, sweet wines, cocktails, and sherry.
	Clear meat and chicken soups and broths. Vegetables as flavouring if desired. Yeast and meat extracts. (See recipes of soups with negligible food value, p. 236.)	Thickened soups, gravies, and stews.
Condiments, flavourings, and sweets.	Salt, pepper, mustard, vinegar, saccharine. Essences such as vanilla, almond, peppermint, raspberry.	Oil and salad dressings made with oil, such as mayonnaise, salad cream, etc. Sugar and sweets.

SUITABLE DISHES FOR LOW CALORIE DIETS

Soups.

Clear soups made in the usual way.
Consommé, meat extract, chicken broth carefully freed from fat, yeast extract.
Asparagus soup (p. 236).
Cauliflower or spinach soup (p. 236).
Mixed vegetable soup (p. 236).

Yeast or meat extract skimmed milk soup (p. 242).
Tomato soup (p. 241).
Celery or mushroom skimmed milk soup (p. 236).

Puddings. Lemon or orange jelly (p. 237).
Agar-agar jelly (p. 237).
Coffee jelly (p. 237).
Fruit whip (p. 246).
Skimmed milk jelly (p. 248).
Skimmed milk junket (p. 248).

Bulky salads and savoury dishes providing about 80 Calories. See recipes, p. 238.

LIGHT, EASILY DIGESTED DIETS

Suitable for:— PAGE

Arsenic poisoning 68
Carcinoma of the stomach 68
Chronic cholecystitis 72
(Appreciable amounts of fat and starch must not be taken together. Therefore golden syrup, honey, or jam should be spread on bread instead of butter, and cream is not allowed at a meal at which potatoes, bread, or other starchy food is being served. Pastry, Yorkshire and suet pudding are forbidden. Fish and meat must not be cooked with fat.)
Chronic gastritis of pernicious anæmia 68
Convalescence from fever, operations, or from any disease not requiring a special diet 59
Convalescence from mucous colitis 76
Digestive disturbances following radiotherapy 58
Dyspepsia 65
Old age 48
(A milk soup or beverage may be taken in the evening and a light dinner at mid-day.)
Pregnancy with indigestion or vomiting 46
(Well-sugared lemonade, barley sugar, or milk and biscuits should be taken last thing at night by those suffering from morning sickness.)

Breakfast. Cornflakes or flour of oatmeal with milk and sugar to taste.
Bread or cold toast and butter with jelly marmalade, apple, bramble, or other jelly, honey, golden syrup, or black treacle.
Weak tea or coffee with milk and sugar to taste.

Mid-morning. Milk, lemonade, or orangeade.
Biscuit, if desired.

Dinner. Strained white soup, small portion (no onion), or tomato juice, if desired.
Fish, steamed or boiled, or rabbit, chicken, tripe, sweetbreads, or minced mutton.
Potatoes, mashed, boiled, or baked in their jackets.
Sieved spinach or young carrots or flower of cauliflower.
Milk pudding, custard, blancmange, stewed fruit (see list, p. 128).

Tea. Bread and butter with jelly jam, yeast extract, cream cheese, or tomato purée.
Sponge or Madeira cake, or plain biscuits.
Weak tea, milk and sugar to taste.

Supper. As dinner, or a lighter meal may be taken if desired.

Note on Light Easily Digested Diets.

Some raw fruit juice should be taken daily. If the patient has a tendency to flatulence, fluids should be taken between meals and not with them.

FOOD LIST FOR LIGHT DIETS

	Allowed without special restriction	Forbidden
Bread, biscuits, cereal foods, etc.	Stale bread and toast (not wholemeal). Plain biscuits, sweetened or unsweetened. Cornflakes, puffed rice, patent barley, groats, flour of oatmeal. Rice, tapioca, barley kernels, macaroni, spaghetti, vermicelli, cornflour, arrow-root, semolina, sago.	New bread or rolls, wholemeal bread, hot buttered toast. Digestive, coconut, whole wheat, and rye biscuits. Shredded wheat and other wholemeal cereals and coarse porridge. Pastry, suet dumplings, crust, and puddings.
Dairy products	Fresh milk in any form. Dried milk or proprietary infant or invalid milk foods. Milk or cream cheese. Butter and cream in moderate amounts. Plain ice cream with meals only.	Ice cream between meals. Cheddar and all hard cheeses.
Eggs	Eggs, boiled, poached, or scrambled.	Fried eggs.
Fish	Boiled, steamed, or baked haddock, cod, sole, plaice, skate, turbot, halibut, trout, fresh boiled cod's or herring's roe; raw oysters.	Herrings, bloaters, kippers, salmon, sardines, eels. Lobster, crab, shrimps, etc. Fried fish.
Meat and fowl ..	Tender portions of the following :— Chicken, game if not high, rabbit, lamb or mutton, or steak. Liver, sweetbreads, brains, tripe.	Coarse or fat meats, such as beef, pork, duck, goose, and the sinewy parts of any meat or poultry. Fried meat or made up dishes. Heart.
Fruit	*Raw fruit* (when allowed by the physician). —Mashed banana, peeled and stoned grapes, orange without any of the white septum, ripe peaches and apricots. *Fruit juices.*—Orange juice and any other sweet fruit juice well strained; tomato juice.	*Raw fruit.*—Apples, pineapple, gooseberries, currants, strawberries, raspberries, and all fruits containing pips or coarse fibres.

	Cooked fruits.—Apples, baked or stewed, avoiding skin and core, stewed peaches and apricots, fresh or tinned; pears, stewed or tinned, avoiding stringy parts. *Purées.*—Any stone fruit, dried or fresh, may be taken provided it is sieved; *e.g.* stewed prunes, stewed dried apricots, stewed plums.	*Cooked fruits.*—Stewed fruits containing pips, such as gooseberries, loganberries, etc. Dried fruits, unless sieved.
Nuts	None.	All nuts.
Vegetables ..	Potatoes, boiled, mashed, or baked in their jackets. (Skin must not be eaten.) Flower of cauliflower. Young carrots or sieved old carrots. Sieved fresh peas, spinach, marrow, beetroot or tomatoes.	Baked (roast) or fried potatoes. Cabbage, turnips, swedes, dried or broad beans, dried peas or lentils, onions, leeks. Celery and rhubarb. Lettuce, cress, and all raw salads. Parsley.
Beverages ..	Weak tea and coffee, cocoa, Ovaltine and Bournvita, Instant Postum.	Strong tea and coffee. Aerated mineral waters for patients with flatulence.
Soups	Yeast extract, chicken or rabbit broth, strained tomato, potato, and milk soups. Meat soups and meat extracts in small amounts.	
Condiments and preserves	Salt in moderation. Honey, golden syrup, jelly.	Pepper, mustard. Vinegar, mayonnaise, and other salad dressings, pickles, chutney, horseradish. Jam containing pips, peel marmalade, ginger.

SUITABLE DISHES MADE FROM FOODS LISTED AS ALLOWED

Soups.

Cream of potato; cream of tomato; potato, tomato. (Onion must be avoided.)
Chicken or rabbit broth with rice, tapioca, macaroni, or vermicelli.
Cream of chicken soup (p. 232).
Yeast extract mixed with milk.

Eggs and cheese.

Eggs boiled, poached, or scrambled.
Creamed eggs (p. 259).
Cream cheese and tomato savoury (p. 257).

Fish.

Steamed, boiled, grilled, or baked fish with plain white or tomato flavoured or egg sauce.
Creamed fish (no parsley allowed), steamed fish cream (p. 233), fish custard (p. 233).
Fish soufflé (use minimum of cream).

Meat and fowl.

Tender meat, roast, grilled, boiled, or steamed. Plain gravy or sauce.
Creamed chicken or rabbit.
Chicken or rabbit custard (p. 233).
Chicken jelly (p. 233) or chicken or sweetbread in aspic.
Sweetbreads or brains, steamed, or stewed in milk, served with white sauce.
Tripe stewed with tomato sauce or in milk (no onion) (p. 244).

Puddings.

Milk puddings, rice, tapioca, ground rice, semolina, vermicelli, macaroni (avoid any burnt skin).
Creamed rice, tapioca, or barley kernels.
Blancmange, vanilla or chocolate.
Junket, vanilla or chocolate.
Jellies, fruit flavouring or milk, including chocolate milk jelly.
Soufflés, vanilla, chocolate, etc., hot or cold.
Meringues with a little cream. Apple meringue (p. 234).
Bavarian cream.
Charlotte russe.
Mousses.
Strained fruit whips, *e.g.* apple, apricot, prune (p. 246).
Queen of puddings (p. 234).
Plain steamed pudding with custard or golden syrup.
Egg custard, baked or boiled, or custard made with custard powder.
Bread-and-butter pudding (p. 234).

Orange mould (p. 234) or fruit sago (p. 247).
Trifle (p. 246).
Butterscotch sago (p. 258).

Note.—Cream for cooking or as an addition to the pudding should be used in small amounts only unless specially prescribed.

Cakes. Sponge and Madeira cake. Angel cake (p. 247).

Sweets. Small amounts of plain or milk chocolate or barley sugar may be taken after meals.

SEMI-SOLID DIET

Suitable for:— PAGE

Achalasia 64
Bulbar palsy 63
Carcinoma of the œsophagus—early stages 64
Fever 58
Fractured jaw 61
Quinsy 63
Radiotherapy of throat 58
Sore throat 63
Tonsillectomy 63
Tubercular laryngitis 63

Breakfast. Porridge, groats, or patent barley. Milk and sugar.
Lightly boiled or poached or scrambled egg if desired.
Tea or coffee with milk and sugar to taste.

Mid-morning. Soft stewed fruit, mashed banana, ice cream or milk drink.

Dinner. Minced fish, chicken, or rabbit mixed with white sauce.
Potatoes mashed with butter and milk or white sauce.
Sieved vegetables.
Milk pudding, custard, jelly, junket, or ice cream.
Stewed or baked apple, or other soft fruit.

Tea. Bread and milk or milk pudding.
Tea with milk and sugar if desired.

Supper. Cream or purée soup (p. 232).
Scrambled or creamed eggs or French toast (p. 235) or fish custard (p. 233).
Pudding, or cereal as at breakfast.

Bedtime (if desired). Warm cornflour, arrowroot, boiled custard, or bread and milk.

Fresh tomato juice or orange juice with sugar to taste should be taken daily.

All food must be brought to a semi-solid consistency before serving.

The calorie value of the diet may be increased by adding glucose or other sugar and cream to foods and beverages or by using a fortified milk mixture (p. 231).

Tonsillectomy.—Ice cream is usually appreciated at least once a day after tonsillectomy, quinsy, or any other conditions where the throat is sore. Acid beverages and fruit, such as fresh lemonade and grapefruit, should not be given.

Bulbar palsy.—Fluids are swallowed with great difficulty and should therefore be omitted.

FLUID DIET

Suitable for:— PAGE

Acute diarrhœa—intermediate stages 75
(1,500 Calorie fluid diet. Fruit juices must be carefully strained through butter muslin.)

Burns (early stages) 92

Carcinoma of the œsophagus 64

Fever 58
(If the patient's throat is sore, acid beverages must be avoided.)

Radiotherapy 58

Tube feeding for gastric ulcer 65

Typhoid and paratyphoid fever—acute stages 60
(Fruit juices must be carefully strained through butter muslin.)

FLUID FEEDS PROVIDING 1,500 TO 3,000 CALORIES ARRANGED FOR TWO-HOURLY FEEDING

(Quantities in ounces)

Calories	1,500	2,000	2,500	3,000
Feeds by day.				
1. Egg (No.)	1	1	1	1
1. Milk mixture	5	5	5	6
1. Glucose	—	—	¼	½
2. Yeast extract				
2. Milk mixture ..	6	6	6	7
3. Junket or milk jelly ..	5	5	6	6
3. Glucose	—	¼	¼	½
3. Cream	—	½	1	1
4. Orange or lemon juice	1	1	1	1
4. Sugar or glucose ..	—	½	1½	2
5. Milk mixture	6	6	6	6
5. Cream	—	½	1	1
5. Glucose	—	¼	¼	½
5. Tea or coffee if desired				
6. Boiled custard or ice cream — Egg (No.) ..	1	1	1	1
6. Boiled custard or ice cream — Milk mixture	5	5	5	6
6. Boiled custard or ice cream — Cream ..	—	½	½	1
6. Boiled custard or ice cream — Glucose ..	—	¼	¼	½
7. Orange or lemon juice	1	1	1	1
7. Glucose	—	1	1½	2

Calories		1,500	2,000	2,500	3,000
Feeds by day.—cont.					
8.	Milk mixture	5	5	6	7
	Glucose	—	¼	¼	½
	Cocoa, Ovaltine, or Bournvita	¼	¼	¼	¼
Feeds by night.					
1.	Milk mixture	6	6	6	6
	Cream	—	—	½	1
	Glucose	—	—	½	½
2.	Egg (No.)	1	1	1	1
	Milk mixture	6	6	6	6
	Glucose	—	—	—	½
Total daily quantities.					
Milk, fresh whole / Milk, full-cream dried — Milk mixture		40	40	42	46
		4	4	4	4
Eggs (No.)		3	3	3	3
Glucose or other sugar ..		—	2½	4¾	7¼
Cream		—	1½	3	3½
Cocoa, Ovaltine, or Bournvita		¼	¼	¼	¼
Orange or lemon juice ..		2	2	2	2
Tea or coffee to taste					
Carbohydrate (grams) ..		106	178	245	322
Protein (grams)		85	86	89	92
Fat (grams)		97	115	137	151

Note on Fluid Diets.

To increase Calories beyond 3,000, extra feeds similar to those above should be given.

Ordinary sugar may be substituted for glucose if a sweeter beverage is preferred, or lactose if the glucose is too sweet. Where glucose is not well tolerated an equal weight of cream may be substituted.

Unless very sweet beverages are desired, orange juice should be used in those containing little or no sugar, and lemon juice where sugar or glucose is given.

Water may be taken with fruit drinks as desired.

5 oz. (fluid)=a small breakfast-cupful. ¼ oz. glucose=a level dessertspoonful. ¼ oz. cocoa, Ovaltine, or Bournvita=1 teaspoonful.

FLUID FEEDS BASED ON FORTIFIED MILK

Fortified milk has considerable advantages, especially when cream is unobtainable and eggs are scarce. It is made by adding 2 oz. dried full-cream milk powder to each pint of fresh milk; the food value of this mixture is Carbohydrate, 50 g., Protein, 33 g., Fat, 39 g., Calories, 680 per pint.

To this mixture, glucose, lactose, or other sugar, Ovaltine, Bournvita, Benger's Food, Horlick's Malted Milk, etc., and such eggs as are available should be added to increase the Calories.

Thus, to make a fluid diet providing 2,000 Calories, 2½ pints of the milk mixture should be used in the day. This may be divided into ten 5-oz. feeds, to which should be added, for example, 1 egg, ½ oz. Ovaltine, ½ oz. Horlick's Malted Milk and 1 oz. sugar during the day. This diet will provide 173 g. Carbohydrate, 93 g. Protein, and 107 g. Fat. More or less of the mixture may be given to increase or decrease the Calories as required.

At least one fruit drink should be given during the day.

DIET SUITABLE FOR PATIENTS WITH GASTROSTOMY OR JEJUNOSTOMY

Calories	1,500		2,000		2,500		3,000	
Food	g.	oz.	g.	oz.	g.	oz.	g.	oz.
Milk	1,200	40	1,200	40	1,200	40	1,200	40
Cream	—	—	60	2	120	4	240	8
Glucose	45	1½	120	4	180	6	210	7
Full-cream dried milk	45	1½	45	1½	45	1½	45	1½
Eggs (No.) ..	4		4		4		4	
Carbohydrate (g.)	117		192		253		285	
Protein (g.) ..	71		72		73		75	
Fat (g.)	81		105		129		177	
Calories	1,480		1,990		2,450		2,920	

Instructions.—Divide into number of feeds required. 3 oz. well strained orange juice should be given once or twice a day between feeds, and 1 teaspoonful of yeast extract or other vitamin B concentrate should be added to one of the milk feeds. 5 g. common salt should be given each day, dissolved in the feeds.

ALTERNATIVE DIET FOR PATIENTS WITH GASTROSTOMY OR JEJUNOSTOMY

Soluble protein	1 oz.
Dried milk, full cream	4 oz.
Fresh milk	2 pts.
Sugar, lactose, or glucose	2 oz.
Eggs, fresh or reconstituted	2
Butter or margarine	1 oz.
Yeast extract	1 teasp.
Salt	½ teasp.

Carbohydrate 164 g., Protein 106 g., Fat 106 g., Calories 2,030.

Method.

Reconstitute dried eggs, add one pint milk, cook lightly in a double saucepan.

Mix dried milk with a little of the remaining milk, boil the rest and add to mixture, then add sugar, butter, salt, yeast extract, and lightly cooked egg.

Divide into number of feeds required. This diet is arranged for six 8-oz. feeds.

Supplements of iron and concentrates of vitamins A, D, and C can be added to the diet if prescribed by the doctor.

Method of Feeding.—The drip system is usually considered the most satisfactory for jejunostomy as it diminishes diarrhœa and jejunal regurgitation. It should be used at the rate of two drops a second, *i.e.* 6 c.c. per minute.

DIETS FOR HYPOCHLORHYDRIA

Suitable for:— PAGE

Simple hypochlorhydric dyspepsia 65

Chronic gastritis accompanying pernicious anæmia 68

Nutritional anæmia with hypochlorhydria 96

(Yeast extract should be used as a sandwich spread or as a beverage between meals in these last two conditions. Liver may be included regularly in the diet if the patient enjoys it.)

On waking. Orange or tomato juice.

Breakfast. Boiled or poached egg or steamed white fish.
Bread or toast and butter.
Small cup of tea if allowed, with milk and sugar to taste (see note below).

Mid-morning. Small slice of bread and butter, or biscuit if allowed (see note below).
Tea or coffee with milk and sugar to taste.

Dinner. Orange juice or small cup of yeast extract or beef broth.
Roast or stewed lamb or rabbit (tender portion), chicken, tripe, or steamed or grilled white fish.
Mashed potatoes.
Flower of cauliflower, or new carrots or other vegetables, sieved.
Milk pudding, custard, or blancmange, or apple meringue (p. 234), or bread and butter pudding (p. 234).

Tea. Small slice bread and butter with jelly jam or yeast extract, or biscuit if allowed (see note below).
Tea with milk. Sugar to taste.

Supper. As dinner, or
Boiled or poached egg, or fresh milk or cream cheese.
Bread and butter or biscuits.

Bedtime. Small slice of bread and butter, or biscuit if allowed (see note below).
Boiled milk or milk drink.

Note on Diets for Hypochlorhydria.

For foods allowed and forbidden and list of suitable dishes, see p. 126. Special care must be taken to keep the amount of fat in each meal low. Glucose or lactose may be used in sweet beverages and puddings to increase the calorie value.

In certain cases no fluids should be taken with solid food; in others, small amounts of fluid are given with the main meals, and a biscuit or small slice of bread and butter with the fluid feeds. The physician should be consulted in each case as to which arrangement is desirable.

DIETS FOR GASTRIC OR DUODENAL ULCER

Suitable for:— PAGE

Gastric and duodenal ulcer 65
Gastrectomy 66

LENHARTZ TYPE OF TREATMENT, DIETS 1–7

Diet	1	2	3	4	5	6	7
Total daily amounts							
Eggs (No.)	1	1	2	3	3	3	4
Sugar (oz.)	—	—	1¼	1¼	1¼	2½	2½
Milk (oz.)	9	15	18	22	27	33	36
Approximate composition of diets							
Carbohydrate (g.) ..	12	20	59	64	71	114	118
Protein (g.)	14	19	28	38	42	48	56
Fat (g.)	16	23	32	43	48	55	64
Calories	250	365	635	790	885	1,140	1,270

Arrangement of Feeds.—Milk is given alternately with egg and milk every two hours by day, and during the night there should be two milk feeds. On Diet 1 each feed consists of 1 oz. and is increased by ½ oz. for each successive diet, reaching 4 oz. on Diet 7.

Calorie Value.—It should be noted that Diets 1–5 provide very few Calories, and are therefore rarely used except after a gastrectomy.

Milk Feeds.—Fresh whole milk, previously boiled, or dried whole milk should be used. It may be flavoured with Ovaltine, Bournvita, or Instant Postum if desired, or Horlick's Malted Milk or infant food may be substituted for some of the feeds.

Eggs.—When eggs are scarce, fortified whole milk mixture (p. 231) may be substituted for egg and milk feeds.

Sugar.—If ordinary sugar is too sweet, glucose or lactose may be substituted.

LENHARTZ TYPE OF TREATMENT, DIETS 8–14

Feeds by day	Food	Diets 8	9	10	11	12	13	14
1	Milk .. .. oz.	5	5	5	5	5	5	5
	Buttered rusks or cream crackers .. .. .. No.	—	1	1	1	2	2	2
	Gruel .. .. oz.	—	—	—	—	—	—	3
	Sugar .. .. oz.	½	½	½	½	½	½	½
2	Egg and milk .. .. .. oz.	5	5	5	5	5	5	5
	Buttered rusks or cream crackers .. .. .. No.	—	—	1	1	1	1	2
	Sugar .. .. oz.	½	½	½	½	½	½	½
3	Milk .. .. oz.	5	5	5	5	5	5	5
	Buttered rusks or cream crackers .. .. .. No.	—	1	1	1	2	2	2
	Sugar .. .. oz.	½	½	½	½	½	½	½
4	Egg and milk .. .. .. oz.	5	—	—	—	—	—	—
	Fish	—	2	2	2	2	2	2
	Pudding .. .. .. oz.	—	3	3	3	3	3	3
	Buttered rusks or cream crackers .. .. .. No.	—	—	—	1	1	1	2
	Sugar .. .. oz.	½	½	½	½	½	½	½
5	Milk .. .. oz.	5	5	5	5	5	5	5
	Buttered rusks or cream crackers .. .. .. No.	—	1	1	1	1	2	2
	Sugar .. .. oz.	½	½	½	½	½	½	½
6	Egg and milk .. .. .. oz.	5	5	5	5	5	5	5
	Buttered rusks or cream crackers .. .. .. No.	—	1	1	1	1	2	2
	Sugar .. .. oz.	½	½	½	½	½	½	½
7	Milk .. .. oz.	5	5	5	5	5	5	5
	Pudding .. .. .. oz.	—	3	3	3	3	3	3
	Buttered rusks or cream crackers .. .. .. No.	—	—	—	1	1	1	2
	Sugar .. .. oz.	½	½	½	½	½	½	½
8	Egg and milk .. .. .. oz.	5	5	5	5	5	5	5
	Buttered rusks or cream crackers .. .. .. No.	—	—	1	1	1	1	2
	Sugar .. .. oz.	½	½	½	½	½	½	½
Feeds at night when awake.	1. Milk .. .. oz.	5	5	5	5	5	5	5
	Sugar .. .. .. oz.	½	½	½	½	½	½	½
	2. Milk .. .. oz.	5	5	5	5	5	5	5
	Sugar .. .. .. oz.	½	½	½	½	½	½	½
Approximate composition of diets.								
Carbohydrate .. .. g.		158	203	208	219	230	241	286
Protein .. .. g.		71	91	92	93	95	97	104
Fat .. .. g.		83	127	130	136	154	161	180
Calories		1710	2380	2440	2550	2770	2880	3270

Puddings.—Equivalent amounts of the following puddings may be substituted for milk throughout the diets.

Custard Powder Custard.

Gruels made from flour of oatmeal, strained porridge (p. 240), barley groats, or patent barley.

Jellies made with milk and orange jelly made with well-strained orange juice and gelatine. Flavoured water jellies may be given occasionally provided they are not very acid.

Junket or Blancmange flavoured with vanilla, almond, or ratafia. Ovaltine or Bournvita may be scattered on the junket if desired.

Milk Puddings made from sago, semolina, tapioca, vermicelli, barley kernels, cream of wheat, ground or flaked rice or very well cooked whole rice.

Egg Custard, boiled or baked, may be substituted for egg and milk mixture.

Biscuits.—The most suitable are cream crackers or rusks, which should be well buttered. Rusks made from slices of bread baked in the oven may also be given. Plain biscuits, such as Marie or Arrowroot, may be substituted occasionally. Digestive or wholemeal varieties should not be given because of the roughage they contain.

Fish.—The following or similar white fish are suitable: Fresh haddock, hake, plaice, skate, sole, turbot, and also soft roes. The fish should be slightly salted, boiled, or steamed, and served with milk and butter, or plain white sauce. One tablespoonful equals approximately two ounces. No condiments besides salt should be used.

Water.—This should be drunk between feeds, not more than 5 oz. being taken at a time.

Orange Juice.—This should be well strained and taken twice a day between feeds.

HIGH CALORIE TYPE OF TREATMENT

Arranged for two-hourly feeding. Amounts in ozs.

Feeds by day	Food	Diets 1	2	3
1	Whole milk (fresh or dried)	5	5	5
	Flour of oatmeal (see recipe, p. 240) or patent barley	5	5	5
	Thin crustless stale bread (not wholemeal) and butter, slices .. .. No.	—	1	2
2	1 egg beaten up in milk	5	5	5
	Sugar, glucose, or barley sugar..	½	½	½
	Buttered cream crackers or rusks	—	1	2
3	Whole milk (fresh or dried)	5	5	5
	Yeast extract to taste.			
	Thin crustless stale bread (not wholemeal) and butter, slices .. .. No.	—	1	2
4	Fresh strained orange juice	1	1	1
	Vegetable purée (see list, p. 140)	3	4	5
	Boiled or steamed white fish and plain white sauce	—	—	3
	Pudding (see list, p. 138)	5	5	5
	Cream	1	1	1
5	1 egg beaten up in milk	5	5	5
	Sugar, glucose, or barley sugar..	½	½	½
	Buttered cream crackers or rusks	—	1	2
6	Whole milk, fresh or dried	5	5	5
	Pudding (see list, p. 138)	5	5	5
	Fruit purée (see list, p. 140)	3	3	3
	Cream	—	1	1
7	White soup (see recipe, p. 233) or whole milk (fresh or dried)	5	5	5
	Buttered cream crackers or rusks	—	1	2
8	1 egg beaten up in milk	5	5	5
	Sugar, glucose, or barley sugar..	½	½	½
	Pudding (see list, p. 138)	5	5	5
	Fruit purée (see list, p. 140)	3	3	3
Feeds at night (when awake)	1. Whole milk (fresh or dried)	5	5	5
	2. 1 egg beaten up in milk	5	5	5
Between feeds	Strained orange or tomato juice	1	1	1
	Water between all feeds	5	5	5
Approximate food values :	Carbohydrate .. .. .. g.	260	310	370
	Protein .. .. g.	80	85	115
	Fat .. .. g.	100	160	180
	Calories	2320	3110	3660

Notes on High Calorie Type of Treatment.

Milk.—Whole milk, fresh or dried or infant food may be used, flavoured if desired with Ovaltine, Bournvita, Horlick's Malted Milk, Instant Postum or yeast extract.

Eggs.—When eggs are scarce, the fortified whole milk mixture (p. 231) may be used instead of the egg and milk feeds.

Cream.—If cream is scarce or too expensive, ½ oz. of butter or vitaminised margarine may be substituted for each ounce of cream, and should be added to vegetable purée or soup in Diets 1 and 2, or to the fish in Diet 3.

Purées.—The following cooked fruits and vegetables are suitable for purée; they should be rubbed through a sound hair sieve; for potatoes a wire sieve or ricer may be used.

Fruits: Apple, peach, pear, if not woody, dried prunes, mixed dried fruit, or apple rings.

Vegetables: Carrot, cauliflower, potatoes, marrow, spinach.

White Soups.—See p. 232.

Fish.—See list of suitable fish, p. 138.

Puddings.—See p. 138.

Sugar.—Whenever possible feeds should be sweetened with sugar or glucose in order to increase their calorie value.

Salt.—All suitable feeds should be seasoned with salt in moderation, but no other condiments should be used.

Vitamins:—

Vitamins A and D: Cod or halibut liver oil and malt or halibut liver oil capsules should be taken before meals three or four times a day.

Vitamin B complex: yeast extract should be taken at least once a day in milk or on bread or biscuits.

Vitamin C: At least 1 oz. of fresh well-strained orange juice should be taken twice a day. Fresh tomato juice or a full tumbler of tinned tomato juice may be substituted for a change occasionally. Fruit juices must not be mixed with milk feed or the milk will curdle. Ascorbic acid tablets may also be prescribed.

Diets for Convalescence from Gastric or Duodenal Ulcer.

Dinner.—The tender parts of chicken or meat, brains, sweetbreads, or well-stewed tripe without onion, may be substituted for fish. Thin crustless stale bread (not wholemeal) and butter may be substituted for cream crackers or rusks at two or three feeds. Otherwise the diets are similar to those on p. 141.

DIETS FOR HYPERCHLORHYDRIA AND CONVALESCENCE FROM GASTRIC OR DUODENAL ULCER (pp. 64, 67)

Breakfast.
Small serving of flour of oatmeal, groats, patent barley or cornflakes, with milk and sugar, or one egg lightly boiled, poached, or scrambled.
Crustless stale white bread cut thinly or crisp toast (not hot) and butter.
Honey, golden syrup, strained marmalade, apple-blackcurrant, or bramble jelly.

Mid-morning.
¼ pint warm milk with cocoa, Ovaltine, Bournvita, Horlick's Malted Milk or Benger's Food added as flavouring.
Two cream crackers, rusks or other plain biscuits (not wholemeal).

Dinner.
White fish boiled, steamed, or grilled or
Stewed brains, sweetbreads, or tripe with plain white sauce or
Boiled or roast chicken or
Stewed rabbit.
Mashed potato, sieved vegetable.
Milk pudding, custard, junket, or jelly, or plain steamed cake mixture pudding.
Sieved fruit, if desired.

Mid-afternoon. As mid-morning.

Tea.
Weak tea with plenty of milk. Sugar, if desired.
Crustless stale white bread cut thinly or thin crisp toast (not hot) and butter, honey, syrup, or jelly jam.
Plain sponge or Madeira cake, or biscuits.

Supper.
Milk soup or
Egg, boiled or poached, or
Fish, etc.: as at dinner.
Milk pudding or sieved fruit as at dinner.

Bedtime. As mid-morning.

On waking and during the night, if awake, milk and plain biscuits

Interval between feeds. 2–2½ hours. It should never exceed 2½ hours.

Water up to ¼ pint may be taken between feeds and the well-strained juice of an orange or black-currant purée should be taken daily. Fresh or tinned tomato juice may be substituted occasionally. In cases where fruit juices are not tolerated, 50–100 mg. ascorbic acid may be substituted. Larger doses should be given if the patient has been on a diet deficient in vitamin C for some time.

Food should be cooked with a little salt, but no other condiments may be used.

For suitable dishes and recipes, see pp. 126, 138, 140.

This diet may be gradually extended to include tender lamb, mildly cured ham, tongue, liver, veal, and minced beef.

Fruits such as grapes, soft ripe plums, pears and peaches, tender vegetables such as marrow and new carrots, and also plum, greengage or apricot jam may be given at this stage without sieving so long as pips, skins, and stringy portions are avoided.

Foods to be avoided.

New bread, coarse biscuits, and cereals.
Fried foods of all kinds.
Pastries and suet puddings.
Pickles, spices, vinegar, curries.
All highly-seasoned or " made up " dishes.
Tough or twice-cooked meat.
All raw vegetables and salads.
Fruits containing pips and skins.
Alcohol.

SUGGESTED TIMES OF MEALS FOR SHIFT WORKERS SUFFERING FROM HYPERCHLORHYDRIA OR CONVALESCING FROM GASTRIC OR DUODENAL ULCER

Hours of shift.	6 a.m. to 2 p.m.	2 p.m. to 10 p.m.	10 p.m. to 6 a.m.
Times of meals.	5 a.m.		
	7.30 a.m.	7.30 a.m.	6.30 a.m.
	10 a.m.	10 a.m.	9 a.m.
	12.30 p.m.	*12.30 p.m.	Bed
	*3.0 p.m.	3.0 p.m.	
	5.30 p.m.	5.30 p.m.	*5.30 p.m.
	8 p.m.	8 p.m.	*8 p.m.
	10.30 p.m.	10.30 p.m.	10.30 p.m.
	Bed	Bed	1 a.m.
			3.30 a.m.

In the above scheme it is assumed that patients live half-an-hour's journey from their work. It must be re-arranged if longer distances are travelled.

The lines enclose the period at work when meals may consist of buttered cream crackers, rusks, or other plain biscuits, and if easily obtainable a milky drink such as cocoa or very weak tea. Patients must stop work entirely for the few minutes required to eat these snacks and take them punctually. The main cooked meal of the day (fish, etc.) can always be taken at home. This is marked with a *.

On a night shift the main meal may be taken either at 5.30 p.m. or at 8 p.m.

LOW RESIDUE DIETS

Suitable for:— PAGE

Acute diarrhœa (later stages) 75
Amœbic or bacillary dysentery 76
Chronic diarrhœa 75
Convalescence from typhoid fever 59
Lienteric diarrhœa 70
Meals must be taken dry. Fluids must only be taken between them, and must not be very hot.
Mucous colitis 76
Spastic constipation 75
Ulcerative colitis 76
Two pints of milk should be taken daily, and the protein may be further increased by fortifying the milk (p. 231).

Breakfast. Flour of oatmeal, patent barley, or cornflakes with milk and sugar.
Egg or white fish.
Bread (not wholemeal) or toast and butter.
Golden syrup, honey, or strained jelly marmalade.
Tea or coffee with milk and sugar to taste.

Mid-morning. Milk drink or strained orange juice and plain biscuits such as Arrowroot or Petit Beurre.

Dinner. Rabbit, chicken, sweetbread, brains, minced lamb, or fish (not herring or other fish with fine bones).
Mashed potatoes, small serving.
Milk pudding, jelly, junket, or steamed cake mixture pudding, or
Cream cheese and plain biscuits.

Tea. Bread (not wholemeal) and butter.
Jelly, jam, or honey.
Madeira or sponge cake.
Tea with milk and sugar to taste.

Supper. As dinner, *or* egg, cream or milk cheese.
Cocoa made with milk or other milk drink, or carefully strained soup (pp. 231, 232).

During the day. Well-strained orange or tomato juice or ascorbic acid tablets.

Note on Low Residue Diets.

The foods allowed and forbidden and the suitable dishes given under light, easily digested diet, pp. 126, 128, may be used provided that patients do not take any fruit except well-strained orange, tomato or other fruit juice, nor any vegetables except small amounts of mashed potatoes.

For convalescence or mild forms of the above disorders the light, easily digested diet on p. 125 may be used. All fruit and vegetables should be carefully sieved so as to free them from stalks, skins, and pips.

For list of foods high and low in roughage, see p. 146.

HIGH CALORIE, LOW RESIDUE DIET FOR PATIENTS SUFFERING FROM TYPHOID OR PARATYPHOID FEVER (p. 59)

Two-hourly feeds by day.

1. Boiled or poached egg, or patent barley with milk or cream and sugar to taste.
   Bread (not wholemeal) or cold toast and butter.
   Golden syrup or honey.
   Weak tea with milk and sugar to taste.
2. Cream crackers or rusks and butter.
   Coffee made with milk. Sugar to taste.
3. Sponge cake or sweet biscuits (not digestive or wholemeal or coconut).
   Vanilla egg nog (p. 231) or yeast extract and milk.
4. White fish or smoked haddock, steamed or boiled, with white sauce (no parsley).
   Sieved potatoes with milk and butter.
   Chocolate blancmange or milk pudding or vanilla ice cream.
5. Cream crackers or sweet biscuits.
   Strained orange juice, with water if desired.
6. Bread (not wholemeal) or toast (cold) and butter.
   Sponge or Madeira cake.
   Weak tea with milk and sugar to taste.
7. Boiled or poached egg, or fresh milk or cream cheese. Bread (not wholemeal), toast, or biscuits. Butter.
   Milk pudding or custard.
8. Cream crackers or rusks and butter.
   Cocoa, Bournvita, or Ovaltine made with milk. Sugar to taste.

Feeds by night.

1. Biscuits or sponge or Madeira cake.
   Well-strained orange juice, with water if desired.
2. Plain biscuits.
   Boiled milk or milk food.

Patients should take moderate feeds at first, gradually increasing their intake as they improve in health.

Glucose or lactose should be added to all feeds. Plenty of butter or margarine should be used, and 1 to 2 oz. cream or fortified milk mixture (p. 231) in order to increase the calorie value. Extra feeds may be given in order to raise the calorie intake.

Suitable recipes may be chosen from those on pp. 231–235.

HIGH RESIDUE DIET

Suitable for:— PAGE

Constipation due to cæcal stasis 74

On waking.	Water, lemonade, or tea.
Breakfast.	Bran cereal, coarse oatmeal porridge, or Shredded Wheat with milk and sugar to taste. Bacon and tomatoes, sausage, kipper, herring or egg dish. Wholemeal bread or toast and butter. Marmalade. Stewed prunes, figs, or other fruit. Tea or coffee with milk and sugar to taste.
Mid-morning (if desired).	Raw fruit. Tea or other beverage.
Dinner.	Vegetable soup or grapefruit. Meat or fish. Green leaf vegetables (large helping). Potatoes or root vegetables (small helping). Raw or stewed fruit, or steamed fruit pudding.
Tea.	Wholemeal bread and butter. Jam or yeast extract. Fruit cake, oatcakes or Quaker Oats fingers (p. 240). Salad or fruit if desired.
Supper.	As dinner, or herring, kipper, bloater, egg, or cheese. Wholemeal bread and butter. Stewed or raw fruit or salad. Tea, coffee, or cocoa.
Bedtime.	Water or lemonade.

Note on High Residue Diets.

Any food is suitable for high residue diets, but those containing little roughage, such as milk puddings, potatoes, etc., should not be allowed to spoil the appetite for high residue foods. See list, p. 146, for foods high and low in roughage.

Fruit or salad should be taken with each meal. Plenty of fluid should be drunk during the day.

Agar-agar as jelly (p. 237) or added to stewed fruit will have a laxative action.

Foods high in Roughage

Bread, wholemeal

Digestive or coconut biscuits or macaroons

Flour, wholemeal

Fruit, dried or fresh, with edible pips or skins

Green vegetables

Jam with pips or skins

Nuts

Oatmeal or Quaker Oats

Peas and beans

Foods with moderate amounts of Roughage

Fruit (no pips or skins)

Root and stem vegetables

Foods with little or no Roughage

Biscuits, plain (not digestive)

Bread (not wholemeal)

Butter

Cake, Madeira or sponge

Cheese

Cornflour

Cream

Eggs

Fish, steamed (no bones)

Flour (not wholemeal)

Golden syrup or black treacle

Grape juice

Honey

Jelly

Lemon juice, strained

Meat

Milk

Orange or other fruit juice, strained

Rusks

Sugar

Tomato juice, strained

DIET FOR TEST FOR OCCULT BLOOD IN THE FÆCES

No meat or green vegetables should be taken for four to seven days before the test. Ham, bacon, chicken, rabbit, sweetbreads, and all other offal must be avoided, as well as any foods, such as sausages or meat soup, made from them. Fish, cheese, and egg dishes are allowed by some physicians. The recipes on p. 256 for low protein dishes may provide suggestions for a meatless diet, but here the amounts of cheese and egg need not be restricted.

Some physicians forbid all foods except milk, bread (not wholemeal), butter, and cheese for three days before the test.

LOW FAT DIETS

Suitable for:— PAGE

Cholecystitis 72

Gallstones, before or after operations 72

(In some cases a little fat is allowed in the above two conditions, but cholesterol is frequently forbidden, in which case foods rich in it, *e.g.* eggs and brains, may not be taken.)

Cyclical vomiting in children.

(At least 1 pint of skimmed milk and a vitamin A and D concentrate should be given daily.)

Migraine.

(The diet should be high in carbohydrate in the above two conditions.)

Obstructive jaundice 74

Note.—Plenty of sugar and glucose should be taken with low fat diets, as well as sweets such as barley sugar, acid drops, and peppermint creams after meals. The following menus may be used for children over 10 years of age. They should take 1–1½ pints of skimmed milk daily, flavoured with weak tea, Bournvita, or Ovaltine if desired. A special low fat diet suitable for younger children is given on p. 149.

Breakfast.
Porridge or breakfast cereal with skimmed milk and sugar to taste.
Smoked haddock, steamed white fish, or kedgeree (p. 243).
Toast, bread, or crispbread.
Marmalade, jam, or honey.
Tea or coffee with skimmed milk and sugar to taste.

Mid-morning.
Fruit drink, or stewed fruit with sugar or glucose.

Dinner.
Lean meat, chicken, rabbit, tripe, liver, sweetbreads, or white fish, plainly cooked without added fat. No sauces to which fat has been added.
Potatoes.
Any vegetables or salad.
Stewed fruit, fruit jelly, or any other suitable pudding (see list, p. 150).
Lemonade, if desired.

Tea.
Bread and jam, honey, or syrup.
Tomatoes or salad if desired.
Angel cake (p. 247), parkin (p. 248), or buns.
Tea with skimmed milk and sugar to taste.

Supper.
As dinner.
Or Stuffed tomatoes (p. 245).
Macaroni and tomatoes (p. 244).
" Creamed " fish (p. 243).
" Cream " of potato soup (p. 241).
Meat extract and skimmed milk soup (p. 242).

Bread and jam.
Bournvita, Ovaltine, Horlick's Malted Milk made with skimmed milk.

Bedtime. As mid-morning, or skimmed milk drink.

Note.—To increase Calories extra sugar, glucose, or lactose should be taken in beverages, and with stewed fruit and puddings. A fortified skimmed milk mixture (p. 241) may also be used, with Ovaltine or Bournvita if desired.

A light low fat diet can easily be arranged by giving smaller meals and selecting suitable foods and dishes from lists on pp. 126–128. Skimmed milk and sweetened fruit juices are often well tolerated when a patient cannot take more solid food.

LOW FAT DIET FOR CHILDREN

Breakfast. Porridge or Shredded Wheat or other cereal with skimmed milk and sugar to taste.
Smoked haddock or other fish, steamed or boiled.
Bread and marmalade, jam, or golden syrup.
Skimmed milk flavoured with tea or coffee and sugar to taste.

Mid-morning. Fresh or stewed fruit with sugar, or
Bread and jam.
Skimmed milk or well-sweetened lemonade.

Dinner. Steamed fish or stewed rabbit or lean meat.
Boiled or mashed potatoes.
Cabbage or carrots.
Skimmed milk pudding or custard powder custard or other pudding from list (p. 152).
Stewed fruit.

Tea. Bread and jam, or tomato, or meat or yeast extract, or banana sandwiches.
Sugared or currant buns or fruit.
Skimmed milk flavoured with tea and sugar to taste.

Supper. Skimmed milk soup or Ovaltine or Bournvita made with skimmed milk.
Bread and jam, or buns.
Fresh or stewed fruit.

After meals: Barley sugar, acid drops, or boiled sweets. Marshmallows may be used as sweets or with puddings.

Note.—1 to 1½ pints of skimmed milk should be taken in some form daily. Fortified skimmed milk (p. 241) may also be used. As this diet is deficient in vitamins A and D, these should be given medicinally.

HIGH PROTEIN, LOW FAT DIETS

Suitable for all diseases involving damage to the liver cells, such as:—

PAGE

Cirrhosis 73

Infective hepatitis or catarrhal jaundice (later stages) 72

Homologous serum jaundice 72

Breakfast. Porridge or breakfast cereal with sugar and milk or condensed skimmed milk to taste.
Large serving of smoked haddock, or steamed white fish.
Toast, bread, or crispbread.
Marmalade, jam, or honey.
Tea or coffee with skimmed milk and sugar to taste.
Fruit, if desired.

Mid-morning. Drink made from fortified skimmed milk (see p. 241).

Dinner. Large serving of lean meat, chicken, rabbit, tripe, liver, sweetbreads, or white fish, plainly cooked without added fat. No sauces or gravies to which fat has been added.
Potatoes and other vegetables as desired.
Stewed fruit, fruit jelly, or any other suitable pudding (see list p. 152) served with undiluted skimmed sweetened condensed milk or cereal pudding made with fortified skimmed milk.

Tea. Bread, toast, or crispbread.
Jam, jelly, or honey, or skimmed milk cheese.
Tea with skimmed milk and sugar to taste.

Supper. As dinner.

Bedtime. As mid-morning.

FOOD LIST FOR LOW FAT DIETS

	Foods allowed without special restriction	Foods forbidden
Bread, biscuits, cereal foods, etc.	Bread of any kind. Porridge, groats, Shredded Wheat, Force, or other breakfast foods. Angel cake (p. 247), parkin (p. 248), meringues, buns. Low fat soya flour.	Biscuits, shortbread, gingerbread. Cakes (except angel cake). Cream crackers. Full fat soya flour.

	Foods allowed without special restriction	Foods forbidden
Dairy products and eggs.	Skimmed milk, fresh, condensed, or dried. Egg white.	Whole milk, fresh, condensed, or dried. Cream, ice-cream, butter, margarine, cheese. Egg yolk.
Fish	White fish, such as haddock, fresh or smoked, sole, plaice, whiting, skate, turbot, lobster, crab, oysters.	Herrings, fresh or smoked, kippers, bloaters, mackerel, halibut, sardines, anchovies, salmon. Fried fish.
Meat and fowl.	Very lean meat, chicken, rabbit, liver (stewed), tripe.	Fat meat, including pork, ham, bacon, brains, duck, goose.
Animal fats ..	None.	All.
Vegetables ..	All boiled or steamed vegetables, including potatoes and pulses.	Fried potatoes, onions, or other fried vegetables.
Fruits ..	All fruits, fresh, tinned, and dried, except olives and Avocado pears.	Olives and Avocado pears.
Nuts	Chestnuts.	All nuts (except chestnuts) and sweets containing them.
Beverages ..	Tea, coffee, Instant Postum. Ovaltine or Bournvita in small quantities only. Fruit drinks with water or soda water.	Cocoa, chocolate.
Soups ..	Clear meat, chicken, or vegetable soup, or yeast or meat extract (see pp. 241–242). Skimmed milk soups.	Soups and gravies containing fat, soups made with whole milk or cream.
Condiments and flavourings.	All except those containing oil.	Mayonnaise and other salad dressings containing oil.
Sweets ..	Barley sugar, boiled sweets, bull's-eyes, peppermint creams, marshmallows.	Chocolate, toffee, marzipan, fudge or other sweets containing fat or nuts.

LOW FAT DIETS—SUITABLE DISHES

Soups.

Consommé or other clear soup with tapioca, spaghetti, barley, or served with dry toast.
Tomato soup (p. 241). Potato soup (p. 241). Mixed vegetable soup.
Skimmed milk soups.—"Cream" of potato soup (p. 241). Carrot, artichoke, cauliflower, or other vegetable soup (p. 242). Meat or yeast extract, and skimmed milk soup (p. 242).

Fish.

Boiled or steamed fish with parsley or tomato sauce (p. 242).
"Creamed" fish (p. 243).
Scalloped fish (p. 243).
Baked fish with tomatoes or mushrooms (p. 243).
Fish in aspic (p. 243).
Kedgeree (p. 243).
Lobster salad with vinegar or boiled dressing (p. 242).
Fish pie (p. 243).

Meat and fowl.

Stewed lean meat.
Centre cuts of roast lean meat.
Stewed rabbit or liver.
Stewed tripe and onions or tomatoes (p. 244).
Steamed, boiled, or stewed chicken or pigeon.
Roast chicken, pheasant, or guinea-fowl (no skin or fat).
"Creamed" chicken (p. 244).
Chicken jelly (p. 238).

Vegetables and salads.

Potatoes mashed and moistened with skimmed milk.
Celery and apple salad (p. 245).

Puddings.

Blancmange or rice, tapioca, or similar pudding made with skimmed milk.
Fruit sago (p. 247) or fruit mould (p. 247).
Skimmed milk junket or jelly (p. 248).
Apple Charlotte (p. 246). May be made with any fruit.
Apple meringue (p. 247). May be made with any fruit.
Fruit whip (p. 246).
Semolina whip (p. 247).
Meringues with jam or jelly.
Water ices.
Jellies.
Trifle (p. 246).
Skimmed milk custard (p. 245).
"Creamed" rice and banana (p. 246).
Boiled rice and jam.
Orange custard (p. 247).
Orange mould (p. 234).
Compôte of fruit (p. 235).
Summer pudding.
Marshmallows may be used with any pudding or stewed fruit.

Savouries. Macaroni and tomatoes (p. 244).
Baked tomatoes (p. 245).
Stuffed tomatoes (p. 245).
Stuffed egg whites (p. 245).

Beverages. All fruit drinks (p. 232) made as for high calorie diets.
Coffee, Instant Postum, Ovaltine, or Bournvita made with skimmed milk.

DIET FOR CHRONIC PANCREATITIS (p. 70)

Breakfast.	Stewed fruit and sugar, or mashed banana with sugar or jam. Tea or coffee with skimmed milk. Sugar to taste.
Mid-morning.	Well-sugared lemonade, or Benger's Food, Ovaltine or Bournvita made with skimmed milk. Grapes or other fruit.
Dinner.	Steamed fish, chicken, or rabbit. Baked or stewed tomatoes. Skimmed milk junket or jelly, or orange or other fruit jelly. Baked apple or other fruit with sugar.
Tea.	One rusk with jam or honey. Tea with skimmed milk. Sugar to taste.
Supper.	As dinner.

Fat foods are forbidden, starchy ones are reduced to one rusk a day, and protein is allowed in moderation only. Sugary foods, skimmed milk, fruits, and non-starchy vegetables therefore form the basis of the above diet.

FOOD LIST FOR CHRONIC PANCREATITIS

Bread, biscuits, cereal foods, etc.	Small amounts, if allowed.
Dairy products.	Skimmed milk only.
Eggs.	Whites only.
Fish.	White fish, including smoked and fresh haddock, plaice, sole, cod. Oysters.
Meat and fowl.	Very lean meat, tripe, sweetbreads. Chicken, rabbit, guinea-fowl, pheasant, pigeon. Gelatine.
Fruit.	All fruit, raw or stewed, fresh, dried or tinned, except olives and Avocado pears.
Nuts.	None.
Vegetables.	All vegetables except potatoes and pulses.
Beverages.	Tea and coffee. Well-sugared lemonade or other fruit drinks. Benger's Food, Ovaltine, or Bournvita made with skimmed milk.
Soups.	Clear chicken or rabbit broth, or skimmed milk vegetable soups without thickening, flavoured with suitable vegetables or yeast extract.
Condiments and preserves.	Salt and pepper in moderation. Marmalade, jams, honey, golden syrup, treacle, jellies.

DIET FOR CHILDREN SUFFERING FROM CŒLIAC DISEASE (LATER STAGES) (p. 69)

Breakfast.
½ oz. grapenuts with glucose and skimmed milk.
1 oz. dextrinised rusks or Proferin or other starch-free bread made from low-fat soya flour.
¼ oz. butter, honey.
Skimmed milk to drink.

Mid-morning.
Small cup of yeast extract with 1 small dextrinised rusk.

Dinner.
Finely minced chicken, rabbit, liver, or beef; or pounded white fish.
Small serving *sieved* spinach, carrots, or tomato; or flower of cauliflower.
Skimmed milk junket or jelly (p. 248).
Fruit purée and glucose (this should be omitted if diarrhœa returns).

Tea.
1 oz. dextrinised rusks or Proferin bread (see above).
¼ oz. butter.
Seedless jam, jelly, or honey.
Meringue or ½ oz. of plain sponge cake.
Banana purée.
Skimmed milk drink.

Bedtime.
Skimmed milk and glucose.

DIET FOR SPRUE (p. 69)

(Low starch, low fat, high protein.)

DIET I.

Breakfast.	Two rusks. Salisbury steak, 5 oz. (p. 248), or steamed fish, 6 oz. Tea. Skimmed milk. Sugar or glucose to taste.
Mid-morning.	Skimmed milk, 5 oz., and glucose, flavoured with coffee. One rusk.
Dinner.	Orange or tomato juice cocktail, or yeast extract soup (p. 249), or spinach soup (p. 236). Salisbury steak (p. 248), or lean beef or minced liver, 5 oz. Spinach. Sieved banana, strawberries, or baked apple. Meringue and honey or skimmed milk jelly or junket with glucose (p. 248).
Tea.	Two rusks with scraped beef, minced liver, or yeast extract. Tea. Skimmed milk. Glucose.
Supper.	Two rusks. Yeast extract skimmed milk soup (p. 249). Orange jelly (p. 248).
Bedtime.	Vanilla whip (p. 249).
Milk.	Fortified skimmed milk (p. 241) should be taken when possible.
Condiments.	Only salt may be used in seasoning meat dishes. Yeast extract should be taken daily in soup or on rusks.

DIET II.

Add a small portion of boiled or baked custard (p. 249) to dinner.
Honey, golden syrup, or treacle should be spread on rusks.
Later a boiled or poached egg may be given about three times a week.

DIET III.

During convalescence the diet on p. 143 (low residue) would be suitable, provided the fat is kept at a minimum, and yeast extract and large helpings of lean meat or liver are taken daily.

Soups must not be served very hot. Yeast extract should be given daily.

Only white fish (not fat) such as haddock, sole, plaice, cod, etc., are suitable.

Any lean meat, such as beef, veal, leg of mutton may be used, the fat parts being carefully removed.

Proprietary foods such as " Sprulac " and " Prosol," which are rich in protein and contain very little fat, are often well tolerated.

Milk Diet.—A diet consisting of two-hourly feeds of milk (up to half a pint at each feed) is sometimes used for patients suffering from sprue. Well-strained orange or tomato juice should be given daily with this diet.

DIABETIC DIETS (pp. 77–87)

Carbohydrate arrangement with different kinds of insulin

Patients vary very much in their response to insulin, and the proportion of their carbohydrate taken at each meal must be arranged for each individual. There are, however, certain general rules which apply to all patients. Soluble insulin acts quickly, and the meals following the injection should contain the most carbohydrate. Protamine zinc and globin insulins are slow-acting, and if one dose a day is taken, the carbohydrate eaten early in the day must be reduced, and that eaten later increased.

If a mixture of soluble and protamine zinc insulin is given before breakfast, most carbohydrate must be taken at breakfast and supper to cover the action of the two insulins.

The following gives a suggested arrangement for 150 g. of carbohydrate in the day with different types of insulin. If the total carbohydrate prescribed is less or more than this amount, the quantity given at each meal should be decreased or increased accordingly.

	With Injection	Breakfast and Mid-morning	Dinner	Tea	Supper	Bedtime
Soluble insulin before breakfast only	—	50	40	35	25	—
Soluble insulin breakfast and supper	—	50	35	15	50	—
Protamine zinc or globin insulin before breakfast only	10	30	35	25	40	10
Protamine zinc insulin before breakfast and supper	—	30	45	30	45	—
Soluble+protamine zinc insulin before breakfast only	—	35	25	—	40	10

For patients not taking insulin the carbohydrate should be divided evenly among the main meals, snacks at mid-morning and bedtime being counted with breakfast and supper.

DIABETIC DIETS I TO VII

With Carbohydrate only weighed

The following diets are intended to supply a framework into which can be fitted the foods and dishes which suit the patient's tastes and habits. From the beginning bread and potatoes may be interchanged, 1 oz. bread equalling 3 oz. potatoes in carbohydrate value. The diets should be used for a short period, after which greater variety should be introduced with the help of the list of 5-gram carbohydrate portions of food, p. 187, provided the patient can be relied on to keep to accurate quantities and a suitable distribution of carbohydrate during the day. He must be satisfied with the less bulky menu which will result from the changes. For instance, puddings and made-up dishes can be substituted for fruit and custard at dinner and supper, and cake for bread or biscuits at tea.

Gram-ounce equivalents.—For practical purposes 1 oz. has been taken to be equivalent to 30 g. in the Diabetic Diets.

Protein and fat foods need not be weighed, but the patient should understand that they must be taken in moderation only.

Gravies, sauces, and batter. No flour or bread crumbs may be used for gravies, sauces, or coating meat or fish unless weighed and counted in the carbohydrate allowance.

Sausages normally contain carbohydrate which must be reckoned in the total (see p. 190).

Custard, junket, and milk jelly in the Diabetic Diets should be made according to the recipes on pp. 251, 252.

Stewed fruit must always be cooked without sugar.

DIET I. WITHOUT INSULIN

	Carbohydrate 100 g.			Carbohydrate 150 g.			Carbohydrate 200 g.		
	grams	oz.	C. (g.)	grams	oz.	C. (g.)	grams	oz.	C. (g.)
Breakfast.									
Oatmeal (raw weight) or breakfast cereal (or bread ⅔ oz.) with milk from allowance ..							15	½	10·0
Egg, bacon, fish as desired.									
Bread	45	1½	22·5	70	2⅓	35·0	75	2½	37·5
Butter as desired.									
Tea or coffee with milk from allowance.									
Grams carbohydrate			*22·5*			*35·0*			*47·5*
Dinner.									
Clear soup if desired.									
Meat or fish as desired (no thickened gravy, breadcrumbs, or flour).									
Potatoes	75	2½	12·5	150	5	25·0	180	6	30·0
Green vegetables or salad as desired.									
Fruit or root vegetable containing 10 g. C., for instance raw apple (or bread ⅔ oz.) ..	90	3	10·0	90	3	10·0	90	3	10·0
Custard, junket, or milk jelly (or bread ⅔ oz.).							210	7	10·0
Cheese if desired.									
Grams carbohydrate			*22·5*			*35·0*			*50·0*

Tea.									
Bread	45	1½	22·5	75	2½	37·5	75	2½	37·5
Unsweetened biscuits (or bread ⅔ oz.) ..							15	½	10·0
Butter as desired.									
Cheese, egg, salad as desired.									
Tea with milk from allowance.									
Grams carbohydrate			*22·5*			*37·5*			*47·5*
Supper.									
Clear soup or tea with milk from allowance if desired.									
Bread	30	1	15·0	50	1⅔	25·0	75	2½	37·5
Meat, fish, cheese, or egg									
Fruit containing 10 g. C., for instance orange (or bread ⅔ oz.).	120	4	10·0	120	4	10·0	120	4	10·0
Grams carbohydrate			*25·0*			*35·0*			*47·5*
Milk allowance for the day ..	150	5	7·5	150	5	7·5	150	5	7·5

DIET II. WITH SOLUBLE INSULIN BEFORE BREAKFAST

	Carbohydrate 150 g.			Carbohydrate 200 g.			Carbohydrate 250 g.		
	grams	oz.	C. (g.)	grams	oz.	C. (g.)	grams	oz.	C. (g.)
Breakfast.									
Oatmeal (raw weight) or breakfast cereal with milk from allowance (or bread ⅔, 1, and 1⅓ oz. respectively)	15	½	10·0	122	¾	15·0	30	1	20·0
Egg, bacon, fish as desired.									
Bread	75	2½	37·5	110	3⅔	55·0	135	4½	67·5
Butter as desired.									
Tea or coffee with milk from allowance.									
Grams carbohydrate			*47·5*			*70·0*			*87·5*
Dinner.									
Clear soup if desired.									
Meat or fish as desired (no thickened gravy, breadcrumbs, or flour).									
Potatoes	150	5	25·0	180	6	30·0	210	7	35·0
Green vegetables or salad as desired.									
Fruit or root vegetable containing 15 g. C., for instance raw apple (or bread 1 oz.) ..	126	4½	15·0	126	4½	15·0	126	4½	15·0
Custard, junket, or milk jelly (or bread ⅔ oz.)				210	7	10·0	210	7	10·0
Unsweetened biscuits (or bread 1 oz.). ..							22	¾	15·0
Cheese if desired.									
Grams carbohydrate			*40·0*			*55·0*			*75·0*

Tea.									
Bread	60	2	30·0	75	2½	37·5	90	3	45·0
Butter as desired.									
Cheese, egg, salad as desired.									
Tea with milk from allowance.									
Grams carbohydrate			*30·0*			*37·5*			*45·0*
Supper.									
Clear soup or tea with milk from allowance if desired.									
Bread	30	1	15·0	40	1⅓	20·0	50	1⅔	25·0
Meat, fish, cheese, or egg.									
Fruit containing 10 g. C., for instance orange (or bread ⅔ oz.)	120	4	10·0	120	4	10·0	120	4	10·0
Grams carbohydrate			*25·0*			*30·0*			*35·0*
Milk allowance for the day ..	150	5	7·5	150	5	7·5	150	5	7·5

DIET III. WITH SOLUBLE INSULIN BEFORE BREAKFAST AND SUPPER

	Carbohydrate 150 g.			Carbohydrate 200 g.			Carbohydrate 250 g.		
	grams	oz.	C. (g.)	grams	oz.	C. (g.)	grams	oz.	C. (g.)
Breakfast.									
Oatmeal (raw weight) or breakfast cereal with milk from allowance (or bread ⅔, 1, and 1⅓ oz. respectively)	15	½	10·0	22	¾	15·0	30	1	20·0
Egg, bacon, fish as desired.									
Bread	75	2½	37·5	105	3½	50·0	120	4	60·0
Butter as desired.									
Tea or coffee with milk from allowance.									
Grams carbohydrate			*47·5*			*65·0*			*80·0*
Dinner.									
Clear soup if desired.									
Meat or fish as desired (no thickened gravy, breadcrumbs or flour).									
Potatoes	120	4	20·0	180	6	30·0	180	6	30·0
Green vegetables or salad as desired.									
Fruit or root vegetables containing 10 g. C., for instance raw apple (or bread ⅔ oz.) ..	90	3	10·0	90	3	10·0	90	3	10·0
Custard, junket, or milk jelly (or bread ⅔ oz.) ..							210	7	10·0
Cheese if desired.									
Grams carbohydrate			*30·0*			*40·0*			*50·0*

Tea.									
Bread	30	1	15·0	40	1⅓	20·0	60	2	30·0
Butter as desired.									
Cheese, egg, salad as desired.									
Tea with milk from allowance.									
Grams carbohydrate			*15·0*			*20·0*			*30·0*
Supper.									
Clear soup, or tea with milk from allowance.									
Meat, fish, egg, cheese as desired.									
Bread	75	2½	37·5	90	3	45·0	120	4	60·0
Fruit containing 10 g. C., for instance orange (or bread ⅔ oz.)	120	4	10·0	120	4	10·0	120	4	10·0
Plain biscuits (or custard, junket, or milk jelly 7 oz.)				15	½	10·0	15	½	10·0
Grams carbohydrate			*47·5*			*65·0*			*80·0*
Milk allowance for the day ..	210	7	10·0	210	7	10·0	210	7	10·0

DIET IV. WITH PROTAMINE ZINC OR GLOBIN INSULIN BEFORE BREAKFAST

	Carbohydrate 150 g.			Carbohydrate 200 g.			Carbohydrate 250 g.		
	grams	oz.	C. (g.)	grams	oz.	C. (g.)	grams	oz.	C. (g.)
With Injection on waking.									
Plain biscuits (or bread ⅔ oz. and 1 oz. respectively)	15	½	10·0	22	¾	15·0	22	¾	15·0
Tea if desired with milk from allowance.									
Grams carbohydrate			*10·0*			*15·0*			*15·0*
Breakfast.									
Oatmeal (raw weight) or breakfast cereal with milk from allowance (or bread ½ oz. and 1 oz. respectively)	15	½	10·0	15	½	10·0	22	¾	15·0
Egg, bacon, fish as desired.									
Bread	37	1¼	17·5	45	1½	22·5	60	2	30·0
Butter as desired.									
Tea or coffee with milk from allowance.									
Grams carbohydrate			*27·5*			*32·5*			*45·0*
Dinner.									
Clear soup if desired.									
Meat or fish as desired.									
Potatoes	150	5	25·0	210	7	35·0	210	7	35·0
Green vegetables or salad as desired.									
Fruit or root vegetables containing 10 g. C., for instance raw apple (or bread ⅔ oz.) ..	90	3	10·0	90	3	10·0	90	3	10·0
Custard, junket, or milk jelly (or bread ⅔ oz.)							210	7	10·0
Grams carbohydrate			*35·0*			*45·0*			*55·0*

Tea.									
Bread	40	1⅓	20·0	60	2	30·0	70	2⅓	35·0
Butter as desired.									
Cheese, egg, salad as desired.									
Tea with milk from allowance.									
Grams carbohydrate			*20·0*			*30·0*			*35·0*
Supper.									
Clear soup, or tea with milk from allowance.									
Meat, fish, egg, cheese as desired									
Bread	60	2	30·0	110	3½	50·0	120	4	60·0
Fruit containing 10 g. C., for instance, orange (or bread ⅔ oz.)	120	4	10·0	120	4	10·0	120	4	10·0
Plain biscuits (or bread ⅔ oz.)							14	½	10·0
Grams carbohydrate			*40·0*			*60·0*			*80·0*
Bed-time.									
Milk (additional to daily allowance) (or milk 7 oz.)	105	3½	5·0	105	3½	5·0	105	3½	5·0
Ovaltine or Bournvita	7	¼	5·0	7	¼	5·0	7	¼	5·0
Grams carbohydrate			*10·0*			*10·0*			*10·0*
Milk allowance for the day ..	150	5	7·5	150	5	7·5	210	7	10·0

DIET V. WITH PROTAMINE ZINC INSULIN BEFORE BREAKFAST AND SUPPER

	Carbohydrate 150 g.			Carbohydrate 200 g.			Carbohydrate 250 g.		
	grams	oz.	C. (g.)	grams	oz.	C. (g.)	grams	oz.	C. (g.)
Breakfast.									
Oatmeal (raw weight) or breakfast cereal with milk from allowance (or bread ⅔ oz.) ..				15	½	10·0	15	½	10·0
Egg, bacon, fish as desired.									
Bread	60	2	30·0	60	2	30·0	75	2½	37·5
Butter as desired.									
Tea or coffee with milk from allowance.									
Grams carbohydrate			*30·0*			*40·0*			*47·5*
Dinner.									
Clear soup if desired.									
Meat or fish as desired.									
Potatoes	135	4½	22·5	240	8	40·0	240	8	40·0
Fruit or root vegetable containing 10 g. C., for instance raw apple (or bread ⅔ oz.)	90	3	10·0	90	3	10·0	90	3	10·0
Custard, junket, or milk jelly (or bread ⅔ oz.)	210	7	10·0	210	7	10·0	210	7	10·0
Plain biscuits (or bread 1 oz.)							22	¾	15·0
Grams carbohydrate			*42·5*			*60·0*			*75·0*

Tea.									
Bread	60	2	30·0	75	2½	37·5	90	3	45·0
Butter as desired.									
Cheese, egg, salad as desired.									
Tea with milk from allowance.									
Grams carbohydrate			*30·0*			*37·5*			*45·0*
Supper.									
Clear soup or tea with milk from allowance.									
Meat, fish, egg, or cheese as desired.									
Bread	60	2	30·0	90	3	45·0	90	3	45·0
Fruit containing 10 g. C., for instance orange (or bread ⅔ oz.)	120	4	10·0	120	4	10·0	120	4	10·0
Plain biscuits (or bread 1⅓ oz.)							30	1	20·0
Grams carbohydrate			*40·0*			*55·0*			*75·0*
Milk allowance for the day ..	150	5	7·5	150	5	7·5	150	5	7·5

DIET VI. WITH SOLUBLE AND PROTAMINE ZINC INSULIN BEFORE BREAKFAST

	Carbohydrate 150 g.			Carbohydrate 200 g.			Carbohydrate 250 g.		
	grams	oz.	C. (g.)	grams	oz.	C. (g.)	grams	oz.	C. (g.)
Breakfast.									
Oatmeal (raw weight) or breakfast cereal ..	15	½	10·0	15	½	10·0	22	¾	15·0
Milk from allowance.									
Egg, bacon, fish as desired.									
Bread	60	2	30·0	90	3	45·0	120	4	60·0
Butter as desired.									
Tea or coffee with milk from allowance.									
Grams carbohydrate			*40·0*			*55·0*			*75·0*
Dinner.									
Clear soup if desired.									
Meat or fish as desired.									
Potatoes	135	4½	22·5	150	5	25·0	180	6	30·0
Green vegetables or salad.									
Fruit or root vegetables containing 10 g. C., for instance raw apple (or bread ⅔ oz.) ..	90	3	10·0	90	3	10·0	90	3	10·0
Custard, junket, or milk jelly (or bread ⅔ oz.)				210	7	10·0	210	7	10·0
Grams carbohydrate			*32·5*			*45·0*			*50·0*

Tea.									
Bread	40	1⅓	20·0	45	1½	22·5	60	2	30·0
Butter as desired.									
Cheese, egg, salad as desired.									
Tea with milk from allowance.									
Grams carbohydrate			*20·0*			*22·5*			*30·0*
Supper.									
Clear soup or tea with milk from allowance.									
Meat, fish, egg as desired.									
Bread	60	2	30·0	90	3	45·0	90	3	45·0
Fruit containing 10 g. C., for instance orange (or bread ⅔ oz.)	120	4	10·0	120	4	10·0	120	4	10·0
Plain biscuits (or bread 1 oz.)							22	¾	15·0
Grams carbohydrate			*40·0*			*55·0*			*70·0*
Bedtime.									
Milk (additional to daily allowance) (or milk 7 oz.)	105	3½	5·0	105	3½	5·0	105	3½	5·0
Ovaltine or Bournvita	7	¼	5·0	7	¼	5·0	7	¼	5·0
Plain biscuits				7	¼	5·0	7	¼	5·0
Grams carbohydrate			*10·0*			*15·0*			*15·0*
Milk allowance for the day	150	5	7·5	150	5	7·5	210	7	10·0

DIET VII. FOR DIABETIC CHILDREN (SOLUBLE INSULIN TWICE DAILY)

	Insulin before Breakfast and Tea						Insulin before Breakfast and Supper								
	Carbohydrate 100 g.			Carbohydrate 120 g.			Carbohydrate 150 g.			Carbohydrate 175 g.			Carbohydrate 200 g.		
	g.	oz.	C. (g.)	g.	oz.	C. (g.)	g.	oz.	C. (g.)	g.	oz.	C. (g.)	g.	oz.	C. (g.)
Breakfast.															
Oatmeal, raw weight, or breakfast cereal (or bread ⅔ oz.)	15	½	10·0	15	½	10·0	15	½	10·0	15	½	10·0	15	½	10·0
One egg cooked as desired, or small serving of bacon.															
Bread	30	1	15·0	45	1½	22·5	60	2	30·0	75	2½	37·5	90	3	45·0
Butter as desired.															
Milk	210	7	10·0	210	7	10·0	210	7	10·0	210	7	10·0	210	7	10·0
Tea for older children if desired.															
Grams carbohydrate ..			*35·0*			*42·5*			*50·0*			*57·5*			*65·0*
Dinner.															
Clear soup for older children if desired.															
Meat, brains, sweetbreads, rabbit, chicken, or fish.															
Potatoes, boiled or mashed.. ..	60	2	10·0	90	3	15·0	150	5	25·0	150	5	25·0	180	6	30·0
Green vegetables or salad as desired.															
Fruit containing 5 g. C., for instance stewed apple	120	4	5·0	120	4	5·0	120	4	5·0	120	4	5·0	120	4	5·0
Custard, milk jelly, or junket ..	105	3½	5·0	105	3½	5·0	105	3½	5·0	210	7	10·0	210	7	10·0
Grams carbohydrate ..			*20·0*			*25·0*			*35·0*			*40·0*			*45·0*

Tea.														
One egg, cheese (grated for younger children), or fish as desired. May be served at supper for older children if preferred.														
Bread	30	1	15·0	45	1½	22·5	20	⅔	10·0	30	1	15·0	40	1⅓	20·0
Butter as desired.															
Fruit containing 10 g. C., for instance orange	120	4	10·0	120	4	10·0									
Salad for diets of 150 g. C. and upwards.															
Milk	210	7	10·0	210	7	10·0	105	3½	5·0	105	3½	5·0	105	3½	5·0
Tea for older children if desired.															
Grams carbohydrate ..			*35·0*			*42·5*			*15·0*			*20·0*			*25·0*
Supper.															
Milk	105	3½	5·0	105	3½	5·0	210	7	10·0	210	7	10·0	210	7	10·0
Plain biscuit (or bread ⅓ oz.) ..	7	¼	5·0	7	¼	5·0									
Bread							60	2	30·0	75	2½	37·5	90	3	45·0
Fruit containing 10 g. C., for instance orange							120	4	10·0	120	4	10·0	120	4	10·0
Grams carbohydrate ..			*10·0*			*10·0*			*50·0*			*57·5*			*65·0*

Note.—The first two diets are intended for young children whose last meal is tea.

THE "LINE RATION"

One black portion added to one red

Carbohydrate Foods (containing sugar or starch)

Black Portions (10 *g. C.*)	oz.
Rice, Sago, Tapioca (raw)	$\frac{2}{5}$
Biscuit, Toast, or Breakfast Cereals; Flour, Oatmeal, Macaroni (all dry); Jam or Marmalade	$\frac{1}{2}$
Bread (all kinds)	$\frac{2}{3}$
Potato, Peas, or Beans (dried or tinned); Banana or Grapes; Dried Apricots (stewed)	2
Parsnips; Ripe Greengages; Prunes (stewed)	3
Raw Apple, Pear, Cherries, Gooseberries, Plums, Damsons, Orange (skinned); Young Peas or Beetroot	4
Peach or Apricot or Black Currants (ripe); Greengages (stewed); Broad Beans	5
Strawberries; Stewed Pears, Damsons, or Plums	6
Milk (also contains 1 Red Line); Black Currants (stewed); Raspberries or Melon	7
*Apples or Cherries (stewed); Carrots or Leeks	8
*Jerusalem Artichokes; Loganberries; Blackberries (stewed); Swedes	10
*Grapefruit (in skin); Tomatoes; Red Currants	12
*Onions, Turnips, or Radishes	14

* Half portions of these are usually enough.

Negligible Starch Content in Average Helpings of—

Asparagus, Green Artichokes, French Beans, Brussels Sprouts, Cabbage, Cauliflower, Celery, Cranberries, Cress, Cucumber, Egg Plant, Endive, Stewing Gooseberries, Greens, Horse-radish, Lemons, Lettuce, Marrow, Mushrooms, Radishes, Rhubarb, Salsify, Scarlet Runners, Seakale, Spinach.

Extras of no food value: Tea, Coffee, Soda Water, Meat Extracts, ordinary condiments and flavourings.

DIET SCHEME

portion = one Line ration.

Red Portions (*Protein and Fat*)

7½ g. Protein and	*9 g. Fat Extra fat oz*
One Egg	0
Bacon (lean) 1 oz.	0
Ham (lean) 1 oz.	0
Kipper 1 oz.	¼
Herring 1 oz.	¼
Lean Beef or Mutton 1 oz.	¼
Lean Lamb or Veal 1 oz.	¼
Lean Pork or Duck 1 oz.	0
Chicken or Pigeon 1 oz.	¼
Tongue (tinned or fresh) 1 oz.	0
Liver 1 oz.	¼
Kidney or Tripe 1¼ oz.	¼
Rabbit or Hare ¾ oz.	¼
Cheese ¾ oz.	0
White Fish or Sweetbreads 1¼ oz.	¼
Sardines 1 oz.	0
Salmon 1 oz.	¼
Crab or Lobster 1¼ oz.	¼
Pheasant, Grouse, Partridge ¾ oz.	¼
Milk 7 oz. (also contains 1 Black Line)	0

Fats to be added in amounts stated are Meat Fats, Suet, Dripping, Butter, Margarine, Lard, Olive Oil; or Thick Cream in twice the amount stated for other fats.

From *The Line Ration Scheme*. R. D. Lawrence. *By kind permission of the author*. London. H. K. Lewis & Co., Ltd.

DIABETIC LINE RATION DIET

With soluble insulin before breakfast and supper.

Prescription: Carbohydrate .. 150 grams; Protein .. .. 75 ,, ; Fat .. .. 90 ,, ; Calories = 1,760 — 15 black portions and 10 red portions (9 grams fat per portion).

	Black portions	Red portions
Breakfast.		
½ oz. breakfast cereal	1	—
3½ oz. milk on cereal and in tea	½	½
1 oz. bacon	—	1
2 oz. bread	3	—
Mid-morning (or with breakfast).		
2 oz. raw apple or orange	½	—
	5	*1½*
Dinner.		
Clear soup if desired	—	—
2½ oz. lean meat (+¾ oz. butter) ..	—	2½
4 oz. potato	2	—
4 oz. carrots	½	—
Green vegetables as desired	—	—
3½ oz. milk made into junket	½	½
	3	*3*
Tea.		
1 oz. bread	1½	—
¾ oz. cheese	—	1
3½ oz. milk	½	½
Salad as desired	—	—
	2	*1½*
Supper.		
Clear soup if desired	—	—
4½ oz. white fish (+1 oz. butter) ..	—	3½
4 oz. potato	2	—
Fruit from list = 1 Black Line	1	—
⅔ oz. bread	1	—
Bedtime.		
3½ oz. milk	½	½
¼ oz. biscuit	½	—
	5	*4*
Total	15	10

DIABETIC DIET (WEIGHED CARBOHYDRATE, UNWEIGHED PROTEIN AND FAT)

(from Line Ration Diet Scheme)

With soluble insulin before breakfast and supper

Prescription: Carbohydrate 150 grams = 15 black portions.
Protein and fat in moderate helpings as desired.

	Black portions
Breakfast.	
Egg, bacon, kipper, herring, or white fish	—
2 oz. bread	3
Butter as desired	—
4 oz. orange	1
7 oz. milk (part of this may be taken at mid-morning if desired)	1
	5
Dinner.	
Clear soup if desired	—
Average serving of meat, chicken, or fish	—
2 oz. potato	1
Green vegetables or salad as desired	—
4 oz. stewed apple	½
1 oz. bread	1½
Cheese and butter if desired	—
	3
Tea.	
1 oz. bread	1½
Butter as desired	—
Salad, or egg or cheese as desired	—
3½ oz. milk in tea	½
	2
Supper.	
Clear soup if desired	—
Serving of meat, or fish, or cheese, or egg	—
4 oz. potato	2
Green vegetables or salad as desired	—
Fruit from list = 1 Black Line	1
⅔ oz. bread	1
Bedtime.	
7 oz. milk	1
	5
Total	15

A SIMPLE DIABETIC DIET (UNWEIGHED)

With Measured Carbohydrate;
Protein and Fat as desired

(From *A Simple Diabetic Diet*, R. D. Lawrence: H. K. Lewis & Co., Ltd., London)

Foods Allowed with Special Restriction

Non-carbohydrate Foods:

Drinks: Tea, coffee, water, soda, fresh lemonade, clear soups, beef-tea, meat and yeast extracts. Consult doctor about alcohol, if wanted.

Seasoning: Saccharin for sweetening; salt, pepper, vinegar, mustard, oil, unsweetened pickles.

Proteins and Fats:

Average helpings of *animal foods* (fresh or tinned), such as beef, veal, mutton, pork, bacon, ham, liver, kidney, tripe, etc.; eggs, poultry, game, fish, shell-fish, cheese. *Fats*, such as meat fats, butter, margarine, lard, cream, olive oil.

Carbohydrates: Group I.—Unlimited amounts of these vegetables and fruit.

Vegetables: Asparagus, artichokes (globe), Brussels sprouts, cabbage, cauliflower, celery, chicory, cress, cucumber, egg-plant, endive, French or runner beans, greens, horse-radish, kohl-rabi, lettuce, marrow, mushrooms, olives, onions, pumpkin, radishes, seakale, spinach, tomato, turnips.

Fruit: Red currants, cranberries, lemons, stewing gooseberries, rhubarb.

Foods Allowed Only as Prescribed

Group II.—Three tablespoonfuls of the following foods equal ½ *portion* (about 5 g. C.).

Vegetables: Carrots, Jerusalem artichokes, leeks, swedes.

Fruit stewed: Apples, apricots, blackberries, blackcurrants, cherries, damsons, greengages, pears, plums.

Fruit, fresh: Loganberries, raspberries, strawberries.
or ½ Grapefruit, or 12 cherries, or melon (small slice);
or Nuts—All nuts (except chestnuts) up to ¼ lb., weighed unshelled.

Group III.—The following exact amounts equal *one portion* (each about 10 g. C.).

Bread (⅔ oz.), size of measure (see note below).
Potato (size of hen's egg).
Peas or beans, cooked, 2 dessertspoons.
Oatmeal, rice, or tapioca, 1 dessertspoon, measured uncooked.

Milk, teacup (7 oz.).
2 plain or semi-sweet biscuits.
1½ sections Vitaweat, Ryvita.
3 tablespoons any breakfast cereal.
¼ lb. apple or pear.
2 oranges (small), peaches or plums.
Small banana; 6 stewed prunes.
10 average-sized grapes.
Ovaltine, Horlicks, Malted Milk, Benger's Food, 2 teaspoons.
Jam, honey, marmalade, 1 teaspoon.
Any recipe containing 10 g. C. (p. 251. Double portion).

Forbidden Foods

(*a*) The following must not be taken, unless specially allowed, because they contain sugar or starch: sugar, jams, sweets; flour; cakes, pastry, puddings; tinned and dried fruits; figs, dates, grapes, pineapple; beer, stout, cider, port, sweet minerals (lemonade, ginger-beer, ginger-ale, tonic water); sausages; "diabetic preparations"—breads, biscuits, sweets.

(*b*) The following should be taken *only* in the *exact* amounts (see Group III): bread or toast and biscuits; porridge; rice and tapioca; potatoes, peas, and beans; fresh fruit; milk. *Do not use sugar, flour, or breadcrumbs in cooking.*

Sample Diet

Prescription: Carbohydrate 150 grams (*i.e.* 15 portions).

			Grams C.
Breakfast	Group III	3 portions	30
Dinner	Group III	3 portions	30
	Group II	3 tablespoonsful	5
Tea	Group III	3 portions	30
Supper	Group III	3 portions	30
	Group II	3 tablespoonsful	5
Daily, 14 oz. milk			
	Group III	2 portions	20
	Group I	as desired	—
			150

Sickness or illness in patients taking insulin.

If the patient is unable to eat his usual solid diet, he should take at least his usual portions (Group III) or other foods in place of them, chosen from the following:

one portion (equals one cup) milk
or ½ cup of orange juice
or 2 teaspoons Ovaltine or Benger's Food
or 2 teaspoons sugar

The diet should be arranged from these, with plenty of fluid (water or tea) and the usual insulin should be injected.

Note.—A convenient metal measure for the bread may be obtained from H. K. Lewis & Co., Ltd., London.

DIABETIC DIET WITH WEIGHED CARBOHYDRATE, PROTEIN AND FAT

(Carbohydrate 150 g.; Protein 95 g.; Fat 120 g.; Calories 2,070)

Soluble Insulin before Breakfast and Supper

Food g.	Food oz.		C. g.	P. g.	F. g.
		Breakfast			
15	½	Oatmeal, raw weight, or breakfast cereal	10·0	1·7	1·3
		One egg	—	5·9	6·2
30	1	Bacon (raw weight)	—	3·8	16·2
60	2	Bread	30·0	4·8	0·6
210	7	Milk in tea or coffee and on cereal	10·0	6·2	7·6
		Butter from allowance.			
		Grams carbohydrate	*50·0*		
		Dinner			
		Clear soup if desired.			
90	3	Grilled steak (or alternative in Table IV, p. 301)	—	21·6	18·3
150	5	Potatoes	25·0	2·0	—
		Green vegetables as desired.			
240	8	Stewed apples or other fruit containing 10 g. C.	10·0	0·2	—
		Grams carbohydrate	*35·0*		
		Tea			
20	⅔	Bread	10·0	1·6	0·2
30	1	Cheese	—	7·1	9·8
105	3½	Milk in tea	5·0	3·1	3·8
		Butter from allowance.			
		Grams carbohydrate	*15·0*		
		Supper			
		Clear soup if desired.			
180	6	White fish (or alternative in Table IV, p. 301	—	30·6	1·8
120	4	Potatoes	20·0	1·6	—
120	4	Carrots or other vegetables containing 5 g. C.	5·0	0·8	—
60	2	Banana or grapes or other fruit containing 10 g. C.	10·0	0·2	—
105	3½	Milk as custard, junket, milk jelly, or in tea or coffee	5·0	3·1	3·8
20	⅔	Bread or ½ oz. biscuits	10·0	1·6	0·2
		Butter from allowance.			
		Grams carbohydrate	*50·0*		
60	2	Butter allowance for the day	—	0·2	48·4
		Totals for the day	150·0	96·1	118·2

EXAMPLE OF THE USE OF FAMILY RECIPES IN DIABETIC DIETS WITH WEIGHED CARBOHYDRATE, PROTEIN, AND FAT

Soluble insulin before Breakfast and Supper.

Prescription : C., 200 g. ; P., 80 g. ; F., 110 g. ; Calories, 2,171

Food g.	Food oz.		C. g.	P. g.	F. g.
		Breakfast			
200	7	Fish cakes	20·0	24·5	28·0
82	2¾	Bread	41·3	6·1	0·6
60	2	Milk in tea	2·6	1·8	2·2
		Grams carbohydrate ..	*63·9*		
		Dinner			
120	4	Steak and kidney pie or toad-in-the-hole	20·0	17·6	21·6
		Cabbage or other vegetable on p. 190	2·0	1·0	—
90	3	Queen of puddings or chocolate mould or rice or tapioca pudding	20·0	4·5	8·4
90	3	Apple or other fruit containing 10 g. C. (see p. 192)	10·0	—	—
		Grams carbohydrate ..	*52·0*		
		Tea			
32	1	Currant cake, gingerbread, rock buns, jam or treacle tart, or scones with egg	20·0	1·8	5·2
60	2	Milk in tea	2·6	1·8	2·2
		Grams carbohydrate ..	*22·6*		
		Supper			
135	4½	Macaroni cheese	20·0	11·0	18·0
40	1½	Bread or 4 oz. potatoes	20·0	2·9	0·3
75	2½	Trifle	20·0	2·9	2·9
90	3	Milk in tea or coffee	3·9	2·7	3·3
		Grams carbohydrate ..	*63·9*		
20	⅔	Butter all day	—	0·1	16·1
		Total	202·4	77·7	108·8

Note.—For recipes, see pp. 214–230 and analyses, see p. 269.

DIABETIC DIETS FOR PATIENTS

Carbohydrate 300 grams;

	Soluble Insulin before Breakfast		
	grams	oz.	C (g.)
With injection on waking.			
Milk (in tea if desired)			
Plain biscuits (or bread 1 oz.)			
Butter as desired.			
Grams carbohydrate			
Breakfast.			
Oatmeal, raw weight, or breakfast cereal	22	¾	15·0
Egg and bacon or fish as desired.			
Bread	120	4	60·0
Butter as desired.			
Milk on porridge and in tea or coffee	210	7	10·0
Mid-morning.			
Milk	210	7	10·0
Plain biscuits	15	½	10·0
Grams carbohydrate			*105·0*
Dinner.			
Clear soup if desired.			
Meat or fish, good helping.			
Potatoes	240	8	40·0
Fruit, or root vegetable containing 10 g. C., for instance raw apple (or bread ⅔ oz.)	90	3	10·0
Milk pudding (or other pudding containing 25 g. C.)	210	7	10·0
Milk	18	⅔	15·0
Rice or other cereal	7	¼	5·0
Plain biscuits			
Cheese if desired.			
Grams carbohydrate			*80·0*
Tea.			
Bread	90	3	45·0
Egg or cheese.			
Tomato or salad if desired.			
Butter.	22	¾	15·0
Plain biscuits	105	3½	5·0
Milk in tea			
Grams carbohydrate			*65·0*
Supper.			
Meat or fish, good helping.			
Potatoes	150	5	25·0
Green vegetables or salad as desired.			
Fruit containing 10 g. C., for instance orange (or bread ⅔ oz.) ..	120	4	10·0
Custard, junket, or milk jelly	210	7	10·0
Bread			
Bedtime.			
Milk	105	3½	5·0
Ovaltine, Bournvita, Horlick's Malted Milk, or plain biscuits ..			
Grams carbohydrate			*50·0*

Note.—Butter and other fats should be used generously. Clear soup, green vegetables, =

SUFFERING FROM TUBERCULOSIS

Protein and fat unweighed

Soluble Insulin before Breakfast and Supper			Protamine Zinc or Globin Insulin before Breakfast			Protamine Zinc Insulin before Breakfast and Supper			Soluble and Protamine Zinc Insulin before Breakfast		
grams	oz.	C. (g.)	grams	oz.	C. (g.)	grams	oz.	C. (g.)	grams	oz.	C. (g.)
			100 22	3½ ⅞	5·0 15·0						
					20·0						
15	½	10·0	15	½	10·0	15	½	10·0	15	½	10·0
120	4	60·0	60	2	30·0	60	2	30·0	80	2⅔	40·0
210	7	10·0	210	7	10·0	210	7	10·0	210	7	10·0
210 15	7 ½	10·0 10·0	105 7	3½ ¼	5·0 5·0	105 7	3½ ¼	5·0 5·0	210 15	7 ½	10·0 10·0
		100·0			*60·0*			*60·0*			*80·0*
210	7	35·0	210	7	35·0	240	8	40·0	210	7	35·0
90	3	10·0	90	3	10·0	90	3	10·0	90	3	10·0
210 18	7 ⅗	10·0 15·0	210 18	7 ⅗	10·0 15·0	210 18 22	7 ⅗ ⅞	10·0 15·0 15·0	210 18	7 ⅗	10·0 15·0
		70·0			*70·0*			*90·0*			*70·0*
50	1⅔	25·0	90	3	45·0	90	3	45·0	90	3	45·0
105	3½	5·0	105	3½	5·0	15 105	½ 3½	10·0 5·0	105	3½	5·0
		30·0			*50·0*			*60·0*			*50·0*
210	7	35·0	210	7	35·0	210	7	35·0	210	7	35·0
120 210 50	4 7 1⅔	10·0 10·0 25·0	120 210 50	4 7 1⅔	10·0 10·0 25·0	120 210 30	4 7 1	10·0 10·0 15·0	120 210 50	4 7 1⅔	10·0 10·0 25·0
210 15	7 ½	10·0 10·0	210 5	7 ½	10·0 10·0	210 15	7 ½	10·0 10·0	210 15	7 ½	10·0 10·0
		100·0			*100·0*			*90·0*			*100·0*

lad should not be allowed to spoil the patient's appetite for foods of higher nutritive value.

DIABETIC

Carbohydrate 150 grams;

	Soluble Insulin before Breakfast		
	grams	oz.	C. (g.)
With injection, on waking.			
Milk (with tea if desired)			
Glucose or sugar			
Grams carbohydrate			
Breakfast.			
Milk	210	7	10·0
Glucose	20	$\frac{2}{3}$	20·0
Ovaltine, Bournvita, or Horlick's Malted Milk	7	$\frac{1}{4}$	5·0
Mid-morning.			
Orange juice / Glucose } (or lemon juice and water as desired and 15 g. (=½ oz.) glucose).	120 5	4 $\frac{1}{6}$	10·0 5·0
Grams carbohydrate			50·0
Dinner.			
Milk in jelly, junket, or boiled custard / Glucose .. .. / Vanilla to taste .. .. .. } or as egg nog	150 15	5 $\frac{1}{2}$	7·5 15·0
Lemonade. Lemon juice and water as desired / Glucose .. .. }	20	$\frac{2}{3}$	20·0
Grams carbohydrate			*42·5*
Tea.			
Milk with tea	105	$3\frac{1}{2}$	5·0
Glucose	25	$\frac{5}{6}$	25·0
Grams carbohydrate			*30·0*
Supper.			
Soup: Milk .. .. / Cornflour .. .. / Meat or yeast extract to flavour .. .. / Lemon jelly or lemonade .. .. / Glucose .. .. }	150 10	5 $\frac{1}{3}$	7·5 10·0
Bedtime.			
Milk	150	5	7·5
Ovaltine, Bournvita, or Horlick's Malted Milk			
Grams carbohydrate			*25·0*

Note.—Whenever possible the glucos

FLUID DIETS

Protein and Fat unweighed

Soluble Insulin before Breakfast and Supper			Protamine Zinc or Globin Insulin before Breakfast			Protamine Zinc Insulin before Breakfast and Supper			Soluble and Protamine Zinc Insulin before Breakfast		
grams	oz.	C. (g.)	grams	oz.	C. (g.)	grams	oz.	C. (g.)	grams	oz.	C. (g.)
			105 5	3½ ⅙	5·0 5·0						
					10·0						
210 20 7	7 ⅔ ¼	10·0 20·0 5·0	210 7	7 ¼	10·0 5·0	210 7	7 ¼	10·0 5·0	210 10 7	7 ⅓ ¼	10·0 10·0 5·0
120 5	4 ⅙	10·0 5·0	120 5	4 ⅙	10·0 5·0	120 5	4 ⅙	10·0 5·0	120 5	4 ⅙	10·0 5·0
		50·0			*30·0*			*30·0*			*40·0*
150 15	5 ½	7·5 15·0	150 15	5 ½	7·5 15·0	150 15	5 ½	7·5 15·0	150 15	5 ½	7·5 15·0
10	⅓	10·0	10	⅓	10·0	20	⅔	20·0	10	⅓	10·0
		32·5			*32·5*			*42·5*			*32·5*
105 10	3½ ⅓	5·0 10·0	105 20	3½ ⅔	5·0 20·0	105 25	3½ ⅚	5·0 25·0	105 20	3½ ⅔	5·0 20·0
		15·0			*25·0*			*30·0*			*25·0*
150 10	5 ⅓	7·5 10·0	150 10	5 ⅓	7·5 10·0	150 10	5 ⅓	7·5 10·0	150 10	5 ⅓	7·5 10·0
22·5	¾	22·5	22·5	¾	22·5	20	⅔	20·0	22·5	¾	22·5
150 7	5 ¼	7·5 5·0	150 7	5 ¼	7·5 5·0	105 7	3½ ¼	5·0 5·0	150 7	5 ¼	7·5 5·0
		52·5			*52·5*			*47·5*			*52·5*

should be weighed accurately in grams.

LIGHT DIABETIC DIETS

Diabetic patients unable to digest the normal diets given on pp. 159–181 should modify them in accordance with the food lists on p. 126.

For instance, no wholemeal bread or flour should be used. Meat must be tender, or white fish, chicken, rabbit, etc., may be substituted.

Cauliflower should be taken instead of cabbage and 2 oz. grapes or mashed banana substituted for 3 oz. raw apple at dinner.

Bulky meals must be avoided but the amount of carbohydrate of each meal must not be altered. Fat should be taken in strict moderation and no fried foods may be taken.

DIABETIC DIETS FOR PATIENTS SUFFERING FROM DIARRHŒA

The following modifications are necessary in the diets on pp. 159–181 for patients suffering from diarrhœa (see note p. 143).

Bread must not be wholemeal.

Porridge must be sieved to remove husks, or cornflakes substituted.

Fruit. Orange juice should be substituted for other fruit once a day, 4 oz. supplying 10 g. C., and ½ oz. of biscuits (not wholemeal) or ⅔ oz. bread for the other daily 10 g. C. portion of fruit.

Salads and Green Vegetables may not be taken.

Meat and Fish. Only chicken, rabbit, brains, sweetbreads, or very tender meat and white fish may be used. Herrings and sardines must be avoided.

Butter and other Fats must be taken in strict moderation and fried foods forbidden.

Beverages. These must not be very hot nor very cold.

5-GRAM CARBOHYDRATE PORTIONS OF FOOD

(Edible portions unless otherwise stated)

Cereal Foods

	g.	oz.
Biscuit (plain or sweet)	7	$\frac{1}{4}$
Bread (white, National Wheatmeal, or brown)	10	$\frac{1}{3}$
Cornflakes	6	$\frac{1}{5}$
Cornflour	5	$\frac{1}{6}$
Flour	6	$\frac{1}{5}$
Force or Post Toasties	6	$\frac{1}{5}$
Grapenuts	7	$\frac{1}{4}$
Macaroni, raw	6	$\frac{1}{4}$
Oatmeal or Quaker Oats	7	$\frac{1}{4}$
Porridge ($2\frac{1}{2}$ oz. oatmeal to 1 pint water	61	2
Rice or tapioca	6	$\frac{1}{5}$
Ryvita or Vitaweat	7	$\frac{1}{4}$
Sago, raw	5	$\frac{1}{6}$
Shredded Wheat	6	$\frac{1}{5}$
Toast	8	$\frac{1}{4}$

Beverages and Invalid Foods

Benger's Food	6	$\frac{1}{5}$
Bournvita	7	$\frac{1}{4}$
Cocoa	14	$\frac{1}{2}$
Horlick's Malted Milk	7	$\frac{1}{4}$
Instant Postum	7	$\frac{1}{4}$
Ovaltine	7	$\frac{1}{4}$
Virol	7	$\frac{1}{4}$

Miscellaneous High Carbohydrate Foods

Chocolate (plain or milk)	9	$\frac{1}{3}$
Golden syrup or treacle	7	$\frac{1}{4}$
Honey	7	$\frac{1}{4}$
Jam	7	$\frac{1}{4}$
Marmalade	7	$\frac{1}{4}$
Sugar	5	$\frac{1}{6}$

Milk

Whole cow's milk	100 c.c.	$3\frac{1}{2}$
"Household" dried skimmed milk	10	$\frac{1}{3}$
Skimmed milk	100 c.c.	$3\frac{1}{2}$
Unsweetened condensed milk	43	$1\frac{1}{2}$

Vegetables, Raw

Onions	96	$3\frac{1}{2}$
Onions, Spring	59	2
Parsnips	44	$1\frac{1}{2}$
Peas, fresh	47	$1\frac{1}{2}$
Potatoes	24	$\frac{3}{4}$
Radishes	180	$6\frac{1}{4}$
Swedes	116	4
Turnips	132	$4\frac{3}{4}$

Vegetables, Boiled

	g.	oz.		g.	oz.
Beetroot	50	2	Peas (fresh green)	65	2¼
Butter or Haricot beans	29	1	Peas (dried) ..	26	1
Carrots	116	4	Potatoes (old or new)	26	1
Leeks	109	4	Swedes	132	4¾
Onions	185	6½	Turnips	218	7½
Parsnips	37	1¼			

Nuts

Almonds*	116	3½	Cob nuts*	73	2½
Barcelona nuts* ..	96	3½	Peanuts*	58	2
Brazil nuts* ..	122	3½	Walnuts*	100	3½
Chestnuts	14	½			

Fruit

Apple (raw) ..	42	1½	Figs (fresh, raw) ..	52	2
Apple (stewed) ..	114	4	Figs (dried, raw) ..	9	⅓
Apricot (fresh); weight includes stones	82	3	Figs (dried, stewed)	17	½
Apricot (dried stewed)	28	1	Gooseberries (ripe, raw)	54	2
Avocado pear* ..	200	7	Gooseberries (unripe, stewed) ..	282	10
Banana	26	1	Grapefruit ..	94	3½
Blackcurrant purée, tinned	15	½	Grapes (white or black)	31	1
Blackberries (raw)	78	2¾	Greengages (raw); weight includes stones	45	1½
Blackberries (stewed) ..	156	5½	Greengages(stewed); weight includes stones	66	2½
Cherries (raw); weight includes stones	49	1¾	Lichees	40	1½
Cherries (stewed); weight includes stones	122	4½	Loganberries ..	147	5
Cranberries ..	142	5	Medlars	96	3½
Currants (black, red, or white, raw) ..	91	3¼	Melon (yellow or water)	97	3½
Currants (black, red, or white, stewed)	129	4½	Mulberries ..	62	2
Custard apple ..	27	1	Nectarine; weight includes stones..	44	1½
Damsons (stewed); weight includes stones	74	2½	Orange or tangerine	59	2
Dates; weight includes stones ..	8	¼	Orange juice ..	53	2
			Passion fruit ..	81	3
			Peach (fresh); weight includes stones	63	2¼

* These foods in the amounts given contain appreciable quantities of fat.

Fruit—*continued*

	g.	oz.
Peach (dried, stewed)	28	1
Pear (raw) ..	47	1¾
Pear (stewed) ..	74	2½
Pineapple (fresh) ..	43	1½
Plum (raw) ; weight includes stones..	55	2
Plum (stewed) ; weight includes stones	79	2¾
Pomegranate (whole)	77	2½
Prunes (dried, stewed) ; weight includes stones..	32	1
Quince	80	3
Raisins	8	¼
Raspberries (raw)	89	3
Raspberries (stewed)	132	4½
Strawberries ..	83	2¾
Tomatoes	177	6¼

Cakes and Pastry (Recipes, pp. 214–217.)

Biscuits, oatmeal (economical) ..	7	¼
Biscuits, plain (economical) ..	7	¼
Buns, Currant ..	9	⅓
Buns, Rock ..	8	¼
Cake, Cherry ..	9	⅓
Cake, Chocolate ..	9	⅓
Cake, Coconut ..	9	⅓
Cake, Currant ..	8	¼
Cake, Dundee ..	8	¼
Cake, Orange ..	9	⅓
Cakes, Plain (economical)	7	¼
Cakes, Queen ..	9	⅓
Cakes, Rock ..	8	¼
Cakes, Rock (economical)	8	¼
Cake, Sponge ..	9	⅓
Doughnuts ..	10	⅓
Gingerbread ..	8	¼
Jam tarts	8	¼
Jam tarts (economical)	8	¼
Mince pies ..	12	⅖
Pastry, flaky ..	12	⅖
Pastry, short ..	9	⅓
Pastry, short (economical) ..	8	¼
Scones (with egg)..	8	¼
Scones (without egg)	9	⅓
Shortbread ..	8	¼

Puddings (Recipes, pp. 218–224.)

Apple Charlotte ..	18	⅔
Apple dumpling ..	18	⅔
Apple pudding ..	16	½
Apple tart.. ..	15	½
Banana custard ..	28	1
Blancmange ..	28	1
Bread and butter pudding.. ..	30	1
Bread pudding (economical) ..	12	⅖
Cabinet pudding ..	25	1
Canary pudding ..	9	⅓
Castle pudding ..	11	⅖
Chocolate mould ..	24	¾
College pudding ..	10	⅓
Custard, Egg ..	53	2
Custard powder custard	30	1
Dumpling	21	¾
Gooseberry tart ..	16	½
Jam roll, baked ..	9	⅓
Jelly, plain ..	26	1
Jelly, milk.. ..	24	¾
Omelette, Jam ..	19	⅔
Pancakes	14	½
Plum tart	16	½
Queen of puddings	22	¾
Rhubarb tart ..	17	⅗
Rice pudding ..	24	¾
Rice pudding (economical) ..	26	1
Sago pudding ..	25	1

Puddings—*continued*

	g.	oz.
Semolina pudding	26	1
Suet pudding, plain	14	½
Suet pudding with raisins	12	⅖
Suet pudding with sultanas (economical)	13	⅖
Syrup sponge pudding (economical)	9	⅓
Tapioca pudding ..	24	¾
Treacle tart ..	8	¼
Trifle	18	⅔
White sauce, sweet	29	1
Yorkshire pudding	19	⅔
Yorkshire pudding (economical) ..	18	⅔

Savoury Dishes (Recipes, pp. 224–230.)

Beefsteak pudding	23	¾
Bread sauce ..	39	1½
Buck rarebit ..	31	1
Cheese pudding (economical) ..	50	1¾
Cheese sauce ..	57	2
Cheese straws ..	19	⅔
Curried meat ..	58	2
Egg sauce	60	2
Fish cakes.. ..	51	1¾
Fish cakes (economical)	35	1¼
Fish pie	76	2¾
Hotpot	44	1½
Irish stew	64	2¼
Kedgeree	50	1¾
Macaroni cheese ..	33	1¼
Macaroni cheese (economical) ..	39	1½
Onion sauce ..	73	2½
Potato cakes (economical) ..	14	½
Potato soup ..	45	1½
Sausages, fried ..	26	1
Sausage roll ..	14	½
Sausage roll (economical)	11	⅖
Scotch egg ..	49	1¾
Shepherd's pie ..	41	1½
Steak and kidney pie	30	1
Toad-in-the-hole ..	27	1
Welsh rarebit ..	24	¾
White sauce, savoury	51	1¾

The following contain little or no carbohydrate and need not be weighed in diabetic diets:

Vegetables

Asparagus
Brussels sprouts
Cabbage
Cauliflower
Celery
Cucumber
French beans
Lettuce
Mushrooms
Mustard and cress
Rhubarb
Spinach
Watercress

Other Foods

Tea
Coffee, ground
Lemon juice
Soda water
Meat or yeast extract
Clear meat, rabbit or chicken soup
Vinegar
Saccharine
Salt
Pepper
Mustard
Cloves
Nutmeg
Cinnamon
Curry powder

5-GRAM MEASURES OF CARBOHYDRATE FOODS

(For use in an emergency)

Sugar	1 large lump.
Glucose or lactose	1 heaped teaspoon.
Milk	7 tablespoons.
Horlick's Malted Milk	1 heaped teaspoon.
Orange juice	4 tablespoons.
Benger's Food	1 level teaspoon of powder.
Ovaltine or Bournvita	1 very full teaspoon.

1–15-GRAM CARBOHYDRATE PORTIONS OF FRUITS AND VEGETABLES

(Weights are given in grams)

Fruit	How Weighed	Grams Carbohydrate														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Apples, average eating, raw.	With skin and core	11	22	33	44	54	65	76	87	98	109	120	131	141	152	163
Apples, stewed	.. .. ..	23	45	68	91	114	136	159	182	205	227	250	273	295	318	341
Apricots, fresh	With stones ..	16	33	49	65	82	98	114	131	147	163	180	196	213	229	245
Apricots, dried, stewed ..	.. .. ..	6	11	17	22	28	34	39	45	50	56	62	68	73	79	85
Bananas ..	Without skin ..	5	10	16	21	26	31	36	42	47	52	57	63	68	73	78
Blackberries, stewed ..	.. .. ..	31	62	93	124	156	187	218	249	280	312	343	374	405	436	468
Cherries, eating, raw.	With stones and stalks.. ..	10	19	29	39	48	58	67	77	87	96	106	116	125	135	144
Cherries, stewed	With stones ..	24	49	73	98	122	146	171	195	220	244	269	293	317	342	366
Currants, black, red or white, stewed ..	.. .. ..	26	52	77	103	129	155	180	206	232	258	284	310	335	361	387
Damsons, stewed	With stones ..	15	30	44	59	74	89	103	118	133	148	163	177	192	207	222
Dates	With stones ..	2	3	5	6	8	10	11	13	14	16	18	19	21	22	24
Figs, fresh ..	.. .. ..	10	20	31	41	52	62	73	83	93	104	114	124	135	145	155
Figs, dried, stewed ..	.. .. ..	3	7	10	14	17	20	24	27	31	34	37	41	44	47	51
Gooseberries, ripe.	Topped and tailed.. ..	11	22	33	43	54	65	76	87	98	109	119	130	141	152	163
Grapes, black or white,	With skins, pips and stalks ..	7	13	20	26	33	39	46	52	59	65	72	78	85	91	98
Grapefruit ..	No skin, pith or pips	19	38	56	75	94	113	131	150	169	188	206	225	244	263	281
Greengages ..	With skins and stones ..	9	18	27	36	45	54	63	72	81	90	99	108	116	125	134
Greengages, stewed.	With skins and stones ..	13	26	40	53	66	79	93	106	119	132	145	159	172	185	198

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Melon	Flesh only ..	19	39	58	78	97	117	136	155	175	194	214	233	252	272	292
Oranges ..	No outer skin or pips	12	24	35	47	59	71	82	94	106	117	129	141	153	165	176
Orange juice ..	.. .. ..	11	21	32	42	53	64	74	85	95	106	117	127	138	148	159
Peaches ..	With stones ..	13	25	38	51	63	76	89	102	114	127	140	152	165	178	190
Pears, average eating.	With skin and core	13	26	39	52	66	79	92	105	118	131	144	157	170	183	197
Pears, stewed..	.. .. ..	15	29	44	59	74	88	103	118	132	147	162	177	191	206	221
Pineapple, fresh	No skin or core	9	17	26	34	43	52	60	69	77	86	95	103	112	120	129
Plums, dessert	With stones and stalks.. ..	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165
Plums, cooking	With stones ..	18	35	53	71	88	106	124	141	159	177	194	212	230	247	265
Plums, stewed	With stones ..	16	32	47	63	79	95	110	126	142	158	174	190	206	221	237
Prunes, stewed	With stones ..	6	13	19	25	32	38	44	51	57	63	70	76	82	89	95
Raspberries ..	Whole	18	36	53	71	89	107	125	143	160	178	196	214	232	250	267
Strawberries ..	With stalks ..	17	33	50	66	83	100	116	133	149	166	183	199	216	232	249
VEGETABLE (Boiled except where otherwise stated)																
Artichokes; Brussels sprouts; cucumber, raw		59	118	176	235	294	353	412	470	529	588	647	706	764	824	882
Beans, butter		6	12	17	23	29	35	41	44	52	58	64	70	75	81	87
Beetroot		13	25	38	50	63	75	88	100	113	125	138	150	163	175	188
Cabbage; cauliflower; French and runner beans; spinach ..		90	180	270	360	450	540	630	720	810	900	990	1080	1170	1260	1350
Carrots		23	47	70	93	116	140	163	186	209	233	256	279	302	326	349
Leeks		22	43	65	87	109	130	152	174	196	217	239	261	283	304	326
Marrow		71	143	214	286	357	428	500	572	643	714	785	856	928	1000	1072
Onions		37	74	111	148	185	222	259	296	333	370	407	444	481	519	556
Parsnips		7	15	22	29	37	44	52	59	66	74	81	89	96	104	111
Peas, fresh green		13	26	39	52	65	78	91	104	117	130	143	156	169	182	195
Potatoes, peas (dried)		5	10	16	21	26	31	36	42	47	52	57	62	68	73	78
Swedes		26	53	79	105	132	158	185	211	237	264	290	317	343	369	396
Tomatoes, raw		35	71	106	142	177	212	248	284	319	354	389	424	460	496	532
Turnips		43	87	130	174	218	261	304	348	391	435	478	522	565	609	652

COMPOSITION OF ALCOHOLIC BEVERAGES*

	Sugar in 100 c.c. (3½ oz.) grams	Alcohol in 100 c.c. (3½ oz.) c.c.
Wines—		
Bordeaux—		
Vin Ordinaire	0·1	7
Claret	0·2	9
Californian Claret ..	0·15	9
Grâves	0·4	9
Sauterne, dry	1·0	12
Sauterne, sweet ..	2·3	12
Burgundy—		
Average	0·2	11
Australian	0·3	11
Beaune	0·3	11
Californian	0·2	11
Chablis	1·2	9
Pommard	0·2	12
Champagne, dry	1·9	12
Hock	0·0	8
Italian, dry	0·3	10
Madeira	2·0	15
Marsala	3·5	16
Moselle	0·25	8
Port	6·8	17
Sherry, dry	2·0	17
Sherry, sweet	4·0	17
Spirits—		
Brandy, old	0	45
Gin, dry, pre-1914 ..	0	30
Rum, pre-1914	0	43
Rum, Jamaica	0	69
Whisky, pre-1914 ..	0	40–45
Whisky, post-1914 ..	0	20–25
Liqueurs, etc.—		
Absinthe	0	45–55
Benedictine	33	40–50
Brandy	0	45

* From R. D. Lawrence, *The Diabetic Life*, 1947.

	Sugar in 100 c.c. ($3\frac{1}{2}$ oz.) grams	Alcohol in 100 c.c. ($3\frac{1}{2}$ oz.) c.c.
Liqueurs, etc.—*continued*		
Chartreuse	34	43
Crème de Menthe	28	48
Curaçao	29	30–45
Kummel	31	35–55
Vermouth	9·5	14–16
Beers, etc.—		
Ale, beer	4–8	4–5
Cider	0·7–2·0	5–6
Porter, stout	7	5

All sweet wines and liqueurs are forbidden for diabetics, and other alcoholic drinks should be taken only on the physician's prescription. Patients suffering from high blood pressure or gout should avoid alcohol in any form.

HIGH PROTEIN DIETS

Suitable for:— PAGE

Burns 92

Chronic nephritis with œdema, but without nitrogen retention .. 89

	Protein, g.
On waking.	
2 oz. milk in tea.	1·8
Breakfast.	
6 oz. steamed white fish	37·8
3 oz. bread	7·0
Butter and marmalade, small helping	—
6 oz. milk flavoured with tea or coffee	5·4
Mid-morning.	
6 oz. milk	5·4
½ oz. skimmed milk powder	5·0
Flavouring as desired	—
Dinner.	
4 oz. lean meat, rabbit, chicken, etc.	29·0
Potatoes and other vegetables	—
6 oz. milk in pudding	5·4
½ oz. skimmed milk powder	5·0
Stewed or fresh fruit	—
Tea.	
3 oz. bread or scones	7·0
One egg, fresh or reconstituted	6·0
2 oz. milk in tea	1·8
Supper.	
6 oz. steamed white fish or smoked haddock ..	37·8
Vegetables or salad if desired	—
2 oz. bread	4·8
Butter, small helping	—
½ oz. cheese	3·6
5 oz. milk	4·5
Bedtime.	
As mid-morning	10·4
	172·3

Note.—Foods which do not contain protein, especially fat and sugar, should be eaten in small amounts only to avoid spoiling the appetite for the foods rich in protein.

The protein may be still further increased by using more skimmed milk powder, and casein bread in place of some of the ordinary bread (see recipe, p. 261. A pinch of salt should be added to the ingredients given).

RESTRICTED PROTEIN DIETS

Suitable for:— PAGE

Acute nephritis (later stages) 88
Albuminuria of pregnancy (later stages) 90
Chronic nephritis without œdema but with nitrogen retention .. 89
Gradual heart failure 62

Prescription	Protein		
	40 g.	50 g.	60 g.
Breakfast.	oz.	oz.	oz.
Grapefruit or other fruit with sugar ..			
Porridge	6	6	6
or Force or Shredded Wheat	1	1	1
Bread (as toast, if desired)	2	2	2
Marmalade			
Milk in tea and with cereal	3	3	3
Mid-morning.			
Fruit juice with sugar			
Dinner.			
*Chicken or rabbit or fish	1½	2	3
Potatoes and other vegetables as desired			
Stewed fruit			
Low protein pudding (see list, p. 200) ..			
Tea.			
Bread, scones, or buns	2	2	2½
Jam or honey			
Tomatoes or salad (if desired)			
Milk in tea	1	1	1
Supper.			
Fish	1¼	2½	2½
or egg, fresh or reconstituted (see alternatives, p. 256)	one	two	two
or cheese	1	2	2
Salad or vegetables			
Bread	1	1	1½
Stewed or fresh fruit (if desired)			

* *Note.*—Red meat may be substituted for the fish, chicken, or rabbit if allowed by the physician. The quantity should be the same as that given for chicken.

Plenty of sugar should be taken with restricted protein diets, including sweets such as barley sugar, acid drops, peppermint creams, and toffee after meals. Cream and extra butter may be added if the patient is under-weight.

Lemonade and other fruit juices may be taken as desired, and form a convenient vehicle for sugar or glucose.

The meals may be rearranged to taste so long as the total weighed quantities remain the same.

RESTRICTED PROTEIN DIET ADAPTED FOR CHILDREN AND PREGNANT WOMEN

Prescription	Protein		
	40 g.	50 g.	60 g.
Breakfast.	oz.	oz.	oz.
Grapefruit or other fruit with sugar			
Porridge	6	6	6
or Force or Shredded Wheat	1	1	1
Bread (as toast if desired)	1½	1½	2
Marmalade or honey			
Milk in tea	4	4	4
Mid-morning.			
Fruit juice with sugar			
Dinner.			
Chicken or rabbit	1	2	2
or white fish	1¼	2½	2½
Potatoes and other vegetables			
Stewed fruit			
Milk to drink or in pudding	4	5	6
Tea.			
Bread, scones, or buns	1½	2	2
Jam or honey			
Tomatoes or salad (if desired)			
Milk in tea	2	2	2
Supper.			
Fish	1¼	1¼	2½
or egg (see alternatives p. 256)	one	one	two
or cheese	1	1	2
Potatoes and other vegetables (if desired)			
Stewed fruit			
Milk to drink or in pudding	4	5	6

Note.—If the milk at dinner or supper is taken as a beverage, a low protein pudding may be added (see list, p. 200).

Diet for Children.—Omit fish or eggs and vegetables from the evening meal and give the allowance at tea-time.

RESTRICTED PROTEIN DIET

Suitable for patients recovering from acute renal insufficiency with anuria (p. 91).

	Protein, g.
Breakfast.	
Raw or cooked fruit with sugar	—
1 oz. bread	2·4
Butter and jam or marmalade	—
Tea with lemon, or milk from allowance, and sugar	—
Mid-morning.	
Grapefruit, orange, or lemon juice with sugar	—
Dinner.	
6 oz. potato mashed with butter and flavoured with parsley, mint, or nutmeg, etc.	2·4
Green vegetables or salad	—
Stewed fruit with sugar	—
Milk to drink, or as junket, from allowance	—
1 oz. bread	2·4
Butter	—
Tea.	
1½ oz. bread	3·6
Butter	—
Honey	—
Raw or stewed fruit with sugar	—
Tea with lemon, or milk from allowance, and sugar	—
Supper.	
3 oz. boiled rice	1·8
Stewed fruit with sugar	—
1 oz. bread	2·4
Butter	—
Milk to drink from allowance	—
Daily allowances.	
10 oz. milk	9·0
3 oz. butter	—
4 oz. sugar	—
	24·0

Note.—Ordinary helpings of fruit and vegetables will provide a further 2 or 3 grams of protein.

FOOD LIST FOR RESTRICTED PROTEIN DIETS IF SALT IS NOT SPECIALLY RESTRICTED

	Foods allowed without special restriction	*Foods forbidden unless specially allowed*
Bread, biscuits, cereal foods, etc.	Arrowroot, cornflour, rice, tapioca, sago.	Wheat flour contains 3 grams of protein per oz. Bread, pastry, puddings, etc., made from flour must therefore be taken in limited quantities only.
Dairy products.	Butter and cream.	Cheese, milk, or invalid foods containing milk or eggs unless these are calculated as part of the diet.
Meat, fish, and fowl.	Only limited amounts of these foods are allowed. Some physicians forbid "red" meats, though colour is no indication of protein or purine content, chicken, for instance, containing rather more of both substances weight for weight than beef.	
Fruit and nuts.	Any stewed, tinned, or raw fruit or fruit salad. Chestnuts.	All nuts except chestnuts.
Vegetables.	All vegetables and salads except dried pulses.	Dried pulses.
Puddings.	Fruit mould (p. 247), or fruit sago (p. 247). Boiled rice and jam. Butterscotch sago (p. 258). Semolina whip (p. 247).	Puddings made with milk or eggs unless the protein of these is calculated in the diet. Puddings containing wheat flour or breadcrumbs. See note above.
Beverages.	Lemonade, orangeade or any fruit drink. Tea or Instant Postum.	
Soups.	Vegetable soups, such as tomato, parsley, potato, mixed vegetables, yeast extract.	Meat soups and meat extracts if red meat is not allowed.
Condiments, flavourings, and sweets.	All. An excess of salt should be avoided.	None if salt is unrestricted.

LOW PURINE DIETS

Suitable for:— PAGE

Gout 92

Breakfast.
Cornflakes with milk and sugar, or egg, boiled, fried, or scrambled, etc.
Bread (not wholemeal) and butter.
Marmalade.
Very weak tea or Instant Postum with milk and sugar to taste.
Fruit, fresh or stewed.

Mid-morning.
Bread or biscuits and butter.
Tomato or other fruit.
Lemonade.

Dinner.
Yeast extract or vegetable soup (no meat stock).
Cheese soufflé, Welsh rarebit, macaroni cheese with tomatoes, Scotch eggs (p. 257) or other suitable dish (p. 259).
Potatoes and other vegetables or salad.
Milk pudding.
Stewed fruit and sugar.

Tea.
Bread (not wholemeal) and butter.
Jam, honey, or golden syrup.
Biscuits, cake, buns, or shortbread.
Very weak tea with milk and sugar to taste.

Supper.
As dinner.
Or cheese or egg.
Bread and butter.
Fruit, fresh or stewed.
Milk, Instant Postum, or lemonade.

Note on Low Purine Diets.

Some physicians allow tea, coffee, and cocoa since these beverages contain methylpurines, and these substituted purines probably do not give rise to uric acid in the body.

Brown bread, oatmeal, and other whole cereal foods should be avoided.

PURINES IN FOODS

Foods Rich in Purines

	Purine nitrogen Grams per 100 grams
Herring roe (soft)	0·48
Sweetbreads	0·43
Whitebait	0·34
Sprats	0·25
Sardines	0·23
Heart	0·17
Herring	0·17
Mussels	0·15
Liver	0·14
Kidney	0·14
Bloater	0·13
Cod's roe	0·12
Goose	0·10
Venison	0·10
Pheasant	0·10
Trout	0·09
Veal	0·09
Mutton	0·08
Haddock	0·08
Salmon	0·08
Pork	0·07
Chicken	0·07
Bacon	0·07
Cod	0·06
Ham	0·06
Beef	0·06
Crab	0·06
Wholemeal flour	0·04

Beverages Rich in Purines

Marmite	0·36
Bovril	0·32
Oxo cubes	0·24

Foods Poor in Purines

(Less than 0·04 g. of purine nitrogen per 100 g.)

White bread	Tea infusion	Green-leaf vegetables
White flour and other refined cereals	Brains	Root vegetables
	Corned beef	Beans
Eggs	Tripe	Peas
Coffee infusion	Nuts	Lentils

Foods Free from Purines

Milk, fresh or tinned	Margarine	Jam
Cheese	Sugar	Marmalade
Cream and butter	Fruit	Honey

LOW SALT DIETS

Suitable for :— PAGE

Chronic nephritis with œdema, but without nitrogen retention 89
Acute heart failure 62
Gradual heart failure with œdema 62

DIET I

(Strict, containing about 0·1 g. sodium chloride)

Breakfast.
Grapefruit or other fruit, fresh or stewed, with sugar if desired.
Low-salt casein bread (p. 261), toasted if desired.
Low-salt butter or margarine.
Jam or marmalade.
Tea or coffee with low-salt milk (p. 260) and sugar as desired.

Dinner.
Low-salt meat or savoury dish (pp. 261, 262).
Vegetables (see list, p. 205) boiled without added salt or soda. Low-salt butter or margarine may be added as desired.
Stewed fruit.
Cream or custard powder custard or blancmange made with low-salt milk (p. 260).
Low-salt casein bread (p. 261).

Tea.
Low-salt casein bread (p. 261).
Low-salt butter or margarine.
Jam, marmalade, honey, tomato, or mustard and cress.
Shortbread biscuits (p. 262).
Tea with low-salt milk (p. 260) and sugar as desired.

Supper.
Low-salt casein bread (p. 261).
Low-salt butter or margarine.
Low-salt cream cheese (p. 260).
Raw tomato with pepper.
Tea or coffee with low-salt milk (p. 260) and sugar as desired.

DIET II

(Less strict, containing about 0·5 g. sodium chloride)

Breakfast.
Grapefruit with sugar.
Low-salt bread (see note, p. 261).
Low-salt butter or margarine.
Boiled egg.
Jam or marmalade.
Tea or coffee with cow's milk and sugar as desired.

Lunch.
Beef stewed without salt. Curry powder (p. 262) may be added if desired.
Potatoes and boiled rice.
Vegetables boiled without added salt or soda.
Baked apple.
Cream if desired.

Tea.
Low-salt bread.
Low-salt butter or margarine.
Jam, marmalade, honey, tomato, or mustard and cress.
Shortbread (p. 262).
Tea with cow's milk and sugar as desired.

Dinner.
Cold boiled chicken or steamed fish.
Green salad or celery, radishes, or tomato, with pepper.
Low-salt bread.
Low-salt butter or margarine.
Tea, coffee, or cocoa with cow's milk and sugar as desired.

FOOD LIST FOR LOW SALT DIETS

Foods allowed in strictly low salt diets	Additional foods allowed in less strict diets	Foods forbidden in diets with salt restriction
Arrowroot	Chicken, boiled	Bacon
Barley sugar	Chocolate	Baked beans
Boiled sweets	Fresh fish, steamed or boiled without salt	Beef, corned
Bread, low-salt, with or without casein (p. 261)	Eggs	Beef, salt
Butter, low-salt	Meat, stewed without salt. No gravy	Biscuits
Cornflour	Milk, cow's	Bloaters
Cream	Vegetables, raw, or boiled without salt or soda, including beetroot, carrots, celery, radish, spinach, watercress	Bread, baker's
Cream cheese, low-salt (p. 260)		Butter, salted
Flour		Cheese
Fruit, fresh, stewed or tinned		Gravy
Fondant (p. 263)		Haddock, smoked
Gelatine		Ham
Golden syrup		Kippers
Green salads		Margarine, salted
Honey		Meat extracts
Jam		Olives, bottled
Jelly		Proprietary breakfast cereals
Macaroni		Salmon, tinned
Margarine, low-salt.		Sardines
Marmalade		Sausages
Meat dishes, low-salt (pp. 261, 262)		Shellfish
Milk, low-salt (p. 260).		
Mushrooms		
Mustard		
Nuts (not salted)		
Olive oil		
Pepper		
Rice		
Semolina		
Sugar (including glucose and lactose)		
Tapioca		
Tomatoes		
Vegetables, raw, or boiled without salt or soda (not beetroot, carrots, celery, radish, spinach, watercress).		
Vegetables fried in salt-free butter or olive oil		
Vinegar (distilled white wine)		

LOW CALCIUM DIET

Containing 100 *mg. Calcium*

Suitable for :— PAGE

Lead poisoning (used alternately with high calcium diet) 97

TOTAL DAILY QUANTITIES

Food g.	Food oz.		C. g.	P. g.	F. g.	Calcium mg.	Phosphorus mg.	Acid c.c. $\frac{N}{10}$	Alkali c.c. $\frac{N}{10}$
150	5	Bread (not fortified with calcium)	76·0	11·0	1·0	32·8	104·0	20	—
60	2	Beef, raw weight ..	—	11·0	6·0	3·0	156·0	104	—
60	2	Chicken, boiled ..	—	14·8	5·8	6·0	154·0	118	—
100	3½	Apple	12·0	0·3	—	3·6	7·7	—	28
60	2	Banana	11·0	0·6	—	3·8	16·0	—	46
30	1	Cream	0·7	0·5	11·9	16·8	7·1	—	5
80	2⅔	Tomato	2·1	0·8	—	10·1	16·2	—	43
120	4	Potato, baked in skin. Skin discarded ..	28·4	2·8	—	10·4	54·9	—	140
30	1	Bacon, raw weight ..	—	4·0	10·6	3·8	34·6	21	—
45	1½	Butter, fresh	—	0·2	36·3	6·3	10·2	2	—
30	1	Honey	21·7	0·1	—	1·5	4·8	—	2
60	2	Sugar, white	60·0	—	—	0·8	—	—	—
5	⅛	Salt (pure sodium chloride)	—	—	—	—	—	—	—
			211·9	46·1	71·6	98·9	565·5	265	264

Calories = 1,730.

ARRANGEMENT OF MEALS

Breakfast.
Bread .. .. 60 grams
Bacon .. .. 30 ,,
Tomato .. .. 80 ,,
Cream, sugar and butter from allowance.
Tea made with distilled water.

Lunch.
Beef .. .. 60 ,,
Potato .. .. 60 ,,
Banana .. .. 60 ,,

Tea.
Bread .. .. 60 ,,
Honey .. .. 30 ,,
Cream, sugar and butter from allowance.
Tea made with distilled water.

Dinner.
Chicken .. .. 60 ,,
Potato .. .. 60 ,,
Apple .. .. 100 ,,
Bread .. .. 30 ,,

Note on low calcium diets.

Special precautions are necessary in preparing and cooking the food (see p. 99).

The amount of salt and sugar (and glucose or lactose if desired) may be altered to suit the patient's requirement.

LOW PHOSPHORUS DIET

Containing approximately 0·7 g. phosphorus and providing 2,100 Calories

Suitable for :— PAGE

Chronic hypoparathyroidism 100
Renal rickets 100

Food g.	Food oz.		Phosphorus mg.	Calcium mg.
		Breakfast.		
60	2	Orange juice or 3 oz. grapes	12	7
90	3	Bread (not wholemeal)	108	13
30	1	Fried bacon	66	3
		Butter or margarine from allowance.		
30	1	Marmalade	4	10
		Tea with cream from allowance and sugar if desired.		
		Dinner.		
45	1½	Meat or fish or chicken	122	3
120	4	Potatoes	33	5
180	6	Cabbage	41	75
120	4	Stewed fruit	8	2
		Cream from allowance.		
		Tea.		
90	3	Bread (not wholemeal)	108	13
		Butter or margarine from allowance.		
30	1	Jam or marmalade or honey	5	3
		Tea with cream from allowance and sugar if desired.		
		Supper.		
60	2	Bread (not wholemeal)	72	9
		Butter or margarine from allowance.		
60	2	Ham or tinned meat	109	7
90	3	Salad (lettuce, tomato, cucumber, etc.)	22	22
120	4	Raw apple	8	4
		Daily Allowances.		
45	1½	Butter or margarine	10	6
60	2	Cream	14	34
45	1½	White sugar	—	—
			742	216

Foods forbidden unless specially prescribed.—Milk, cheese, eggs, peas, beans, brown bread, oatmeal.

Note.—If the bread is fortified with calcium the calcium in the diet will be increased to 320 mg.

LOW POTASSIUM DIET

Containing approximately 1·5 g. of potassium and providing 2,200 Calories.

Normal potassium intake, approximately 3·5 g. per day.

Suitable for :—

PAGE

Addison's disease 100

Food g.	Food oz.		Potassium grams
		Breakfast.	
90	3	Bread (not wholemeal)	0·10
		One egg	0·07
60	2	Raw apple or other fruit, amount in list containing 0·05 g. K.	0·05
60	2	Milk in tea or coffee	0·10
		Dinner.	
90	3	Roast beef, mutton, pork, steamed or fried cod, or six times any other meat or fish in the list (p. 209)	0·30
60	2	Carrots or marrow, or other vegetable, amount in list (p. 210) containing 0·05 g. K	0·05
80	2⅔	Potatoes cut very small and cooked in eight times their volume of water	0·10
180	6	Stewed apples or 5 oz. stewed pears, or other fruit, twice amount in list (p. 210) containing 0·10 g. K	0·10
22	¾	Cheddar cheese and ⅝ oz. sweet or water biscuit *or* ¾ oz. cereal and 1 oz. cream as pudding, or pear caramel (p. 265)	0·05
		Tea.	
90	3	Bread (not wholemeal)	0·10
37	1¼	Jam or ¾ oz. lettuce or ⅔ oz. tomatoes	0·05
60	2	Milk in tea	0·10
45	1½	Snow cake (p. 267)	0·03
		Supper.	
60	2	Bread (not wholemeal) or 1¾ oz. biscuits (not digestive)	0·07
45	1½	Salmon or haddock or chicken, or three times meat or fish in list	0·15
60	2	Orange, or other fruit, twice amount in list containing 0·10 g. K. or gooseberry fool, twice amount in recipe (p. 266)	0·10
75	2½	Butter or margarine all day	0·01
			1·53

Sugar or glucose, butter, suet and salt may be taken as desired.

Ordinary gravy, and the water from cooked fruit or vegetables must not be used. Special gravy may be made with cornflour and water, coloured with browning, and salted (p. 264).

PORTIONS OF FOOD CONTAINING 0·05 g. OF POTASSIUM

Cereal Foods

	g.	oz.
Arrowroot ..	278	9⅞
Biscuits, Cream crackers ..	39	1¼
Biscuits, Digestive	16	½
Biscuits, Sweet or water	36	1¼
Bread, National Wheatmeal ..	43	1½
Bread, White ..	72	2½
Bread, Wholemeal or Hovis ..	21	¾
Cornflour	82	3
Flour, National Wheatmeal ..	31	1
Flour, white ..	54	2
Oatmeal or Quaker Oats	14	½
Rice	44	1½
Rusks	18	⅔
Tapioca	250	9

Meat, Fish and Dairy Products

	g.	oz.
Bacon, raw weight	23	¾
Beef, Corned ..	43	1½
Beef, roast or boiled	15	½
Beef, stewed ..	33	1¼
Butter, " fresh " ..	333	12
Cheese, Cream ..	106	3¾
Cheese, Cheddar ..	43	1½
Cheese, Packet ..	58	2
Chicken, roast or boiled	14	½
Cod, steamed or fried	14	½
Crab, boiled ..	18	⅔
Cream (40%) ..	55	2
Haddock, fresh or dried, steamed	16	½
Hake, steamed or fried	16	½
Ham, lean, boiled	11	⅓
Kidney, ox, stewed	30	1
Lobster, boiled ..	19	⅔
Margarine, unsalted	1000	35
Milk, fresh, whole	31	1
Milk, evaporated, unsweetened ..	12	½
Milk, whole or skimmed condensed, sweetened ..	10	⅓
Mutton, boiled ..	18	⅔
Mutton, roast ..	14	½
Mutton, neck, stewed	27	1
Plaice, steamed ..	18	⅔
Pork, roast or salt, boiled	16	½
Rabbit, stewed ..	24	¾
Salmon, fresh steamed, or tinned	15	½
Sardines, tinned ..	12	½
Sole, steamed ..	21	¾
Sweetbreads, stewed	22	¾
Tripe, stewed ..	473	17
Veal, roast ..	12	½

1 egg contains 0·07 g. potassium.

Miscellaneous

	g.	oz.
Chocolate, plain or milk	11	⅓
Cocoa	9	⅓
Golden syrup ..	21	¾
Honey	95	3¼
Jam	37	1¼
Marmalade ..	118	4¼

Nuts

	g.	oz.		g.	oz.
Almonds	6	$\frac{1}{5}$	Cobnuts	14	$\frac{1}{2}$
Barcelona nuts ..	5	$\frac{1}{6}$	Coconut, desiccated	7	$\frac{1}{4}$
Brazil nuts ..	7	$\frac{1}{4}$	Peanuts	7	$\frac{1}{4}$
Chestnuts	10	$\frac{1}{3}$	Walnuts	7	$\frac{1}{4}$

Fruit

	g.	oz.		g.	oz.
*Apples, eating, raw	55	2	Lemon juice ..	36	$1\frac{1}{4}$
Apples, stewed ..	89	3	Loganberries, raw	19	$\frac{2}{3}$
*Apricots, fresh, raw	18	$\frac{2}{3}$	Melon	18	$\frac{2}{3}$
Apricots, dried, stewed	5	$\frac{1}{6}$	Orange or orange juice	26	1
Bananas	14	$\frac{1}{2}$	*Peaches, fresh, raw	22	$\frac{3}{4}$
Blackberries, stewed	47	$1\frac{1}{2}$	Peaches, dried, stewed	13	$\frac{1}{2}$
Blackcurrants, stewed	19	$\frac{2}{3}$	*Pears, eating, raw	55	2
*Cherries, raw ..	21	$\frac{3}{4}$	Pears, stewed ..	71	$2\frac{1}{2}$
*Cherries, stewed ..	41	$1\frac{1}{2}$	Pineapple, raw ..	20	$\frac{2}{3}$
Currants, dried ..	7	$\frac{1}{4}$	Plums, raw ..	28	1
*Damsons, raw ..	19	$\frac{2}{3}$	*Plums, stewed ..	28	1
*Damsons, stewed	25	1	Prunes, stewed ..	17	$\frac{2}{3}$
Figs, green, raw ..	19	$\frac{2}{3}$	Raisins, dried ..	6	$\frac{1}{4}$
Figs, dried, stewed	9	$\frac{1}{3}$	Raspberries, raw ..	22	$\frac{3}{4}$
Gooseberries, ripe, raw	30	1	Raspberries, stewed	33	$1\frac{1}{4}$
Gooseberries, stewed	47	$1\frac{1}{2}$	Redcurrants, raw	18	$\frac{2}{3}$
*Grapes	20	$\frac{2}{3}$	Redcurrants, stewed	25	1
Grapefruit ..	22	$\frac{3}{4}$	Rhubarb, stewed ..	17	$\frac{2}{3}$
*Greengages, raw..	17	$\frac{1}{2}$	Strawberries ..	31	1
*Greengages, stewed	26	1	Sultanas, dried ..	6	$\frac{1}{4}$
			Tomatoes, raw ..	17	$\frac{2}{3}$

* Weighed with stones, or skin and core.

Vegetables

	g.	oz.		g.	oz.
Asparagus, boiled (weighed as served)	59	2	Cauliflower, boiled	33	1
Beans, Broad, boiled	22	$\frac{3}{4}$	Celery, raw ..	18	$\frac{2}{3}$
Beans, French or Runner, boiled..	53	$1\frac{3}{4}$	Celery, boiled ..	37	$1\frac{1}{4}$
Beetroot, boiled ..	14	$\frac{1}{2}$	Cucumber, raw ..	36	$1\frac{1}{4}$
Brussels sprouts, boiled	20	$\frac{2}{3}$	Leeks, boiled ..	18	$\frac{2}{3}$
Cabbage, boiled ..	35	$1\frac{1}{4}$	Lentils, raw ..	8	$\frac{1}{3}$
Carrots, boiled ..	57	2	Lentils, boiled ..	23	$\frac{3}{4}$
			Lettuce, raw ..	24	$\frac{3}{4}$
			Marrow, boiled ..	59	2
			Onions, boiled ..	64	$2\frac{1}{4}$
			Onions, Spring, raw	22	$\frac{3}{4}$

Vegetables—*continued.*

	g.	oz.
Parsnips, boiled ..	17	$\frac{2}{3}$
Peas, fresh, boiled	29	1
Peas, dried, boiled	19	$\frac{2}{3}$
Potatoes, old, boiled	11	$\frac{1}{3}$
Potatoes cut very small and cooked in 8 times their volume of water	40	$1\frac{1}{3}$
Potatoes, baked in skin	8	$\frac{1}{4}$
Potatoes, chips ..	5	$\frac{1}{6}$
Potatoes, roast ..	7	$\frac{1}{4}$
Potatoes, new, boiled	15	$\frac{1}{2}$
Radishes, raw ..	21	$\frac{3}{4}$
Spinach, cooked without water ..	10	$\frac{1}{3}$
Spring greens, boiled	42	$1\frac{1}{2}$
Swedes, boiled ..	49	$1\frac{3}{4}$
Turnips, boiled ..	32	1
Watercress, raw ..	16	$\frac{1}{2}$

CHAPTER XIII

RECIPES

GENERAL PROPORTIONS IN COOKERY

A few useful rules and recipes

CEREALS

Coarse cereals (rice, tapioca, etc.).—1½–2 oz. of cereal to 1 pint milk for milk puddings, baked or boiled.

For baked puddings put washed cereal and cold milk in dish and place in a slow oven.

If cereals are to be boiled they should be added to boiling liquid (milk, soup, fruit juice, etc.) to prevent their burning. A double saucepan should be used for puddings. In the case of boiled rice about 2 pints of water should be used to 1½ oz. cereal, and the rice cooked for about 18 minutes, drained, and cold water poured over it to wash away starchy particles which would make the grains stick together.

Porridge.—2–2½ oz. oatmeal to 1 pint water. Add oatmeal to boiling salted water.

Fine cereals (cornflour, arrowroot, custard powder, patent barley, ground rice, etc.).—For moulded shapes, use 1½ oz. cornflour, etc., to 1 pint liquid. For sauces, use 1 oz. to 1 pint.

Mix the cereal to a smooth paste with a little cold liquid. Boil the rest, pour it gradually over the paste, stirring all the time, return to the fire and stir until cooked. A double saucepan should be used if possible.

JELLIES

¾ oz. gelatine or isinglass to 1 pint liquid, or one to one and a half sheets of gelatine to ¼ pint. If acid fruit juice, such as lemon is used, or if the weather is very warm, use from quarter to half as much more gelatine than is given above. If fresh pineapple is used in jellies it must be added when they are nearly set.

CUSTARDS

Two eggs or 3 level tablespoons dried egg powder, reconstituted, to 1 pint milk.

Baked custard.—Beat up fresh eggs, add milk, sugar, and flavouring. Place in pie-dish in a pan of cold water. Bake in a slow oven until set (about 40 minutes). If dried egg is used, first make a boiled custard, then bake as above.

Boiled egg custard.—The quickest way of making this is to boil the milk with sweetening in a double saucepan, and pour it over the beaten-up egg. Return to the pan, stir for approximately two minutes, until it coats a metal spoon (leaving a straight line across it). Remove the upper part of the pan containing the custard immediately from the lower part containing the boiling water; add vanilla or other flavouring. Should the custard have curdled, place in a pan of cold water and stir vigorously.

NOTE ON SWEETENING

Sugars.—Ordinary sugar, known technically as cane sugar, includes the product of both the sugar-cane and the beet. If its flavour is too sweet for a patient, equal calorie value may be obtained from glucose or lactose. It should be noted that lactose can only be dissolved satisfactorily in a warm fluid.

Sugar substitutes.—If sugar is not allowed on account of its fattening properties or in cases of diabetes mellitus, saccharine, saxine, or other sweetening agents without food value may be used. A ½-grain tablet is usually sufficient to sweeten a large cup of tea or coffee, or ¼ pint of custard, milk jelly, or the like. Lemonade or jelly requires about double this amount. Some patients may prefer to use a whole tablet in tea, etc., but if more than that is taken the flavour of the saccharine becomes noticeable and spoils the taste of whatever it is used to sweeten. Saccharine in cooked dishes should, where possible, not be added until 10 minutes before the food has finished cooking.

Sugarless sweetening of acid stewed fruit.—It is usually best to cook the fruit or rhubarb in water and then add a pinch of bicarbonate of soda to neutralise the acid. Scum will form, and this must be removed. Saccharine may then be added to taste. It should be remembered that bicarbonate of soda spoils the flavour of the fruit to some extent, and therefore as little as possible should be used.

NOTE ON THE USE OF DRIED EGG AND SKIMMED MILK POWDER

Dried egg.—One level tablespoon of dried egg powder with two tablespoons of water equals one egg.

Pass the egg powder through a sieve to remove lumps, add water, and beat well. The reconstituted eggs are suitable for making scrambled eggs, omelettes, and for use in all cooked recipes which normally require fresh eggs. They must be used immediately after mixing, and must always be cooked, even for ice cream. For rock cakes and steamed puddings add dry to the flour and use extra liquid in mixing the dough.

"Household" or other dried skimmed milk.—2 oz. of milk powder to 1 pint of water. Sprinkle the milk powder gradually on the surface of the warm (not hot) water, whisking vigorously until no lumps remain.

Milk powder can be added dry to the flour before rubbing in the fat in making steamed puddings and cakes.

RECIPES FOR CAKES, PUDDINGS, ETC., WHOSE COMPOSITION IS GIVEN IN TABLE I.

CAKES

Oatmeal Biscuits (economical).

6 oz. flour.
2 oz. cooking fat.
1 oz. sugar.
6 oz. oatmeal.
1½ oz. reconstituted skimmed milk powder.
½ teaspoon salt.

Rub the cooking fat into the flour. Add the salt, sugar, and oatmeal. Mix to a stiff dough with the reconstituted milk. Roll out thinly and cut into squares. Bake in a moderate oven for 20 minutes.

Plain Biscuits (economical).

6 oz. flour.
2 oz. margarine.
2 oz. sugar.
½ oz. dried egg powder.
About 1 oz. water.
1 teaspoon baking powder.

Rub the margarine into the flour. Add the sugar and baking powder. Mix to a stiff dough with the dried egg powder and water. Roll out and cut into shapes. Bake in a moderate oven for 20 minutes.

Rock Buns.

8 oz. flour.
3 oz. margarine.
3 oz. sugar.
2 oz. currants.
4 oz. milk.
1 teaspoon baking powder.

Rub the fat into the flour. Add the dry ingredients. Mix to a stiff dough with the milk. Place in heaps on a greased tin. Bake in a hot oven for 15 to 20 minutes.

Cherry Cake.

8 oz. flour.
8 oz. butter or margarine.
8 oz. sugar.
3 eggs.
6 oz. glacé cherries.
1 teaspoon baking powder.

Beat the butter and sugar to a cream. Add each egg separately and beat well. Stir in the flour and baking powder and add the cherries cut into pieces. Bake in a moderate oven for 1½ to 2 hours.

Chocolate Cakes.

4 oz. flour.
3 oz. margarine.
4 oz. sugar.
2 eggs.
¼ oz. cocoa.
1 teaspoon baking powder.

Cream the fat and sugar and add the well-beaten eggs. Sift in the flour, cocoa, and baking powder. Beat well. Half fill small cake tins and bake in a moderate oven for 20 to 30 minutes.

Coconut Cakes.

8 oz. flour.
3 oz. margarine.
2½ oz. sugar.
1 egg.
2½ oz. milk.
1½ oz. desiccated coconut.
1 teaspoon baking powder.

Mix the flour, baking powder and sugar and rub in the fat. Add the coconut. Mix to a stiff consistency with the egg and milk. Half fill small cake tins and bake in a hot oven for 15 to 30 minutes.

Currant Cake.

8 oz. flour.
4 oz. margarine.
4 oz. sugar.
2 eggs.
4 oz. currants.
1 teaspoon baking powder.

Cream the sugar and margarine and beat in the eggs. Add the flour and baking powder and then the fruit. Bake in a moderate oven for 1½ to 2 hours.

Orange Cake.

5 oz. flour.
4 oz. margarine.
4 oz. sugar.
2 eggs.
1 oz. orange juice.
1 teaspoon baking powder.

Cream the fat and sugar. Add the eggs slowly, beating well. Sift in the flour and baking powder, and finally mix in the orange juice. Bake in a moderate oven for 1 to 1½ hours.

Plain Cake (economical)

4 oz. flour.
2 oz. sugar.
2 oz. margarine.
½ oz. dried egg powder.
1½ oz. reconstituted skimmed milk powder.
1 oz. water (for reconstituting egg).
1 teaspoon baking powder.

Cream the margarine and sugar. Beat in the reconstituted egg. Add the flour and baking powder and mix to a soft consistency with the reconstituted milk. Bake in a moderate oven for 30 minutes.

Queen Cakes.

6 oz. flour.
4 oz. butter or margarine.
4 oz. sugar.
2 eggs.
1 oz. sultanas.
1 oz. currants.
1 teaspoon baking powder.

Cream the butter and sugar. Add the eggs one at a time and beat well. Stir in the flour and baking powder and add the fruit. Half fill small cake tins and bake in a moderate oven for 20 minutes.

Rock Cakes.

8 oz. flour.
3 oz. margarine.
3 oz. sugar.
1 egg.
4 oz. currants.
1¼ oz. milk.
1 teaspoon baking powder.

Rub the fat, flour, baking powder and sugar well together. Mix in the beaten egg and milk. Add the currants. Drop the mixture in small portions on to a baking sheet. Bake in a hot oven for about 15 minutes.

Rock Cakes (economical).

8 oz. flour.
2 oz. margarine.
2 oz. sugar.
3 oz. sultanas.
½ oz. dried egg powder.
2 oz. reconstituted skimmed milk powder.
1 oz. water (for reconstituting egg).
1 teaspoon baking powder.

Rub the margarine into the flour. Mix in the sugar, baking powder, and sultanas. Mix to a stiff consistency with the reconstituted egg and milk. Drop the mixture in small portions on to a baking sheet. Bake in a hot oven for 20 to 30 minutes.

Sponge Cake.

2 oz. flour.
2 eggs.
2 oz. sugar.

Whisk the sugar and eggs together in a basin over hot water till stiff. Fold in the flour. Bake in a moderate oven for 20 to 30 minutes.

Gingerbread.

6 oz. flour.
2 oz. butter or margarine.
2 oz. sugar.
4 oz. golden syrup.
1 egg.
1¾ oz. milk.
¼ oz. ground ginger.
1 teaspoon sodium bicarbonate

Put the butter, sugar and syrup into a saucepan and heat gently till melted. Beat the egg well. Mix all the ingredients together and bake in a moderate oven for about 1½ hours.

Jam Tarts.

6 oz. uncooked short pastry.
6 oz. jam.

Make short pastry (see p. 217), roll out and cut into rounds to fit the tart tins. Fill each tart with jam and bake in a hot oven for about 15 minutes.

Jam Tarts (economical).

5 oz. uncooked short pastry (economical).
2 oz. jam.

Make the pastry (see p. 217), roll out and cut into rounds to fit the tart tins. Fill each tart with jam and bake in a hot oven for about 15 minutes.

Mince Pies.

10 oz. uncooked short pastry. 5 oz. mincemeat.

Roll out the pastry and cut into rounds. Place half the rounds in tart tins. Fill up with mincemeat and cover with the remaining rounds. Bake in a moderate oven for about 20 minutes.

Pastry, Flaky.

8 oz. flour. 6 oz. margarine.
About 3¾ oz. water.

Make the pastry according to the standard method described in all cookery books.

Pastry, Short.

8 oz. flour. 4 oz. margarine.
About 3½ oz. water.

Make the pastry according to the standard method described in all cookery books.

Pastry, Short (economical).

8 oz. flour. 1 teaspoon baking powder.
3 oz. cooking fat. ¼ teaspoon salt.
About 1½ oz. water.

Mix together the flour, salt, and baking powder. Rub in the cooking fat and mix to a stiff dough with water. Roll out and bake in a hot oven for 10 to 15 minutes.

Scones (with egg).

8 oz. flour. 1 egg.
1 oz. butter or margarine. 4 oz. milk.
1 oz. sugar. 1 teaspoon baking powder.

Rub the butter into the flour and baking powder. Add the sugar, egg and enough milk to make a soft dough. Roll out ½-inch thick and cut into rounds. Bake in a hot oven for 10 to 15 minutes.

Scones (without egg).

8 oz. flour. 5 oz. milk.
1½ oz. butter or margarine. 1 teaspoon baking powder.
¼ oz. sugar.

Rub the fat into the flour, baking powder and sugar. Mix in the milk. Roll out and cut into rounds. Bake in a hot oven for 15 to 20 minutes.

Shortbread.

8 oz. flour.
2 oz. castor sugar. 4 oz. butter or margarine.

Beat the butter and sugar to a cream. Mix in the flour and knead till smooth. Press into a flat tin to about ½ inch in thickness. Bake in a moderate oven for 45 to 60 minutes.

PUDDINGS

Apple Charlotte.

13½ oz. apples, peeled and cored.
3 oz. fresh breadcrumbs.
3 oz. suet.
2½ oz. sugar.
1 oz. jam.
½ oz. margarine.

Grease a pie dish and line with breadcrumbs. Fill the dish with alternate layers of apple, suet, sugar, jam and breadcrumbs. Cover the top with crumbs and place dabs of margarine on the surface. Bake in a moderate oven till golden brown.

Apple Dumpling.

6 oz. flour
3 oz. margarine
About 2½ oz. water.
} short pastry.
3 apples (18½ oz. peeled and cored).
1½ oz. sugar.

Make the pastry. Divide into three and roll out. Peel and core the apples. Place one on each piece of pastry. Fill the centre of the apple with sugar. Work the pastry round the apple until it is well covered. Bake for 30 to 40 minutes in a moderate oven.

Apple Pudding.

8 oz. flour
4 oz. suet
About 4½ oz. water
1 teaspoon baking powder
} suet crust pastry
10 oz. apples, peeled and cored.
3 oz. sugar.
About 1 oz. water.

Make the suet crust pastry. Roll out and line a basin. Trim off the uneven edges. Fill with peeled apples and a little water and sugar. Roll out the trimmings to cover the basin. Steam for 1½ to 2 hours.

Apple Tart.

6 oz. uncooked short pastry.
8 oz. apples, peeled and cored.
2 oz. sugar.
About 1 oz. water.

Place the prepared apples, sugar and water in a pie dish. Roll out the pastry and place over the dish. Bake in a moderate oven for 30 to 40 minutes.

Banana Custard.

1 pint milk
1 oz. custard powder
1½ oz. sugar
} custard
6 bananas.

Make the custard (see p. 220) and slice the bananas into it. Serve when cold.

Blancmange.

1 pint milk.
1½ oz. sugar.
1½ oz. cornflour.

Mix the cornflour to a smooth paste with a little of the milk. Heat the remainder of the milk and sugar together. When hot stir into the paste and then transfer the whole to the saucepan. Cook gently, stirring for about 5 minutes. Turn into a mould and allow to set.

Bread Pudding (economical).

8 oz. stale bread.
2 oz. flour.
1 oz. sugar.
2 oz. cooking fat.
3 oz. sultanas.
1 oz. dried egg powder.
1 oz. reconstituted skimmed milk powder.
8 oz. water for reconstituting egg and for soaking bread.
1 teaspoon ground ginger.
½ teaspoon baking powder.
¼ teaspoon sodium bicarbonate.

Soak the bread in water for 5 to 10 minutes. Drain and break up with a fork. Mix in the flour, sugar, sultanas, ginger, and baking powder. Mix to a soft consistency with melted cooking fat and reconstituted egg. Dissolve the bicarbonate in the reconstituted milk and add last. Bake in a moderate oven for about 45 minutes.

Bread-and-Butter Pudding.

1 pint milk.
1 oz. sugar.
2 eggs.
1 oz. currants.
2½ oz. bread.
¾ oz. butter or margarine.

Cut the bread very thinly and spread with butter. Beat the eggs with the sugar and add the milk. Place the bread and the currants in a pie-dish in alternate layers. Pour the egg and the milk over the bread and bake in a moderate oven for about 30 minutes. Dried egg powder may be used instead of the fresh eggs for making the custard.

Cabinet Pudding.

¾ pint milk.
1½ oz. sugar.
2 eggs.
2 oz. raisins.
3 oz. bread.
½ oz. butter or margarine.

Cut the bread into slices and spread with butter. Mix the egg, sugar, and milk, and pour over the bread and raisins. Soak for about half an hour. Pour into a greased basin. Cover with greased paper and steam slowly till set.

Canary Pudding.

6 oz. flour.
4 oz. butter or margarine.
4 oz. sugar.
2 eggs.
½ oz. milk.
1 teaspoon baking powder.

Cream the butter and sugar together and beat in the eggs. Stir in the flour, baking powder and milk. Bake in a moderate oven for 30 to 45 minutes.

Castle Pudding (baked or steamed).

3 oz. flour.
2 oz. butter or margarine.
2 oz. sugar.
1 egg.
½ teaspoon baking powder.

Cream the butter and sugar together and beat in the egg. Add the flour and baking powder. Put in greased dariole tins and bake in a moderate oven for about 20 minutes or steam for 1 hour.

Chocolate Mould.

1 pint milk.
2 oz. sugar.
1¾ oz. cornflour.
¼ oz. cocoa.

Mix the cornflour and cocoa to a smooth paste with a little of the milk. Heat the rest of the milk and the sugar. Pour the hot liquid on to the paste. Return to the pan and boil for 5 minutes, stirring all the time. Pour into a mould and allow to set.

College Pudding.

2 oz. breadcrumbs.
2 oz. suet.
2 oz. sugar.
1 oz. currants.
1 oz. sultanas.
1 egg.
1 teaspoon baking powder.

Mix all the dry ingredients together. Add the egg, previously well beaten, and stir till thoroughly mixed. Put the mixture into greased dariole tins and bake for 25 minutes.

Custard, Egg, Baked or Boiled.

1 pint milk.
1 oz. sugar.
2 eggs.

For method see p. 212.

Custard, Powder.

1 pint milk.
1½ oz. sugar.
1 oz. custard powder.

Blend the custard powder with a little of the milk. Add the sugar to the remainder of the milk, bring to the boil and pour immediately over the paste, stirring all the time. Allow to cool.

Dumpling.

4 oz. flour.
1½ oz. suet.
About 3½ oz. water.
1 teaspoon baking powder.

Mix all the ingredients together with cold water to form a soft dough. Divide into twelve balls. Flour each one and place in boiling water. Boil for half an hour.

Gooseberry Tart.

6 oz. uncooked short pastry.
8 oz. gooseberries.
2 oz. sugar.
About 1 oz. water.

Place the prepared gooseberries, sugar, and water in a pie-dish. Roll out the pastry and place over the dish. Bake in a moderate oven for 30 to 40 minutes.

Jam Omelette.

2 eggs.
¼ oz. butter or margarine.
1 oz. jam.
½ oz. sugar.

Beat the yolks and sugar together. Whisk the whites stiffly and fold into the yolks. Pour the mixture into an omelette pan and cook until well risen. Brown slightly under the grill. Spread with jam and fold into two.

Jam Roll, Baked.

8 oz. flour.
4 oz. margarine
About 3½ oz. water
} short pastry.
6 oz. jam.

Make the pastry. Roll out and spread with jam. Damp the edges and roll up. Bake in a moderate oven for 40 to 50 minutes.

Jelly.

6½ oz. jelly cubes.
Water.

Dissolve the jelly cubes in a little hot water. Make up to a pint with water. Pour into a mould and allow to set.

Jelly, Milk.

6½ oz. jelly cubes.
Water.
½ pint milk.

Dissolve the jelly cubes in as little hot water as possible. Allow to cool. Add half a pint of milk slowly, stirring all the time. Make up to a pint of mixture with water. Leave to set in a mould.

Pancakes.

4 oz. flour.
½ pint milk.
1 egg.
2 oz. sugar.
1½ oz. margarine.

Break the egg into the flour, add a little milk and stir till smooth. Add the rest of the milk by degrees, beating all the time. Allow to stand for an hour. Heat a little margarine in a frying pan. Pour into the pan enough batter just to cover the bottom thinly. Cook both sides and then turn on to sugared paper. Repeat till all the batter is used up. (Sufficient for about twelve pancakes.)

Plum Tart.

6 oz. uncooked short pastry.
8 oz. plums (weighed with stones).
2 oz. sugar.
About 1 oz. water.

Place the plums, sugar and water in a pie-dish. Roll out the pastry and cover the dish. Bake in a moderate oven for about 30 to 40 minutes.

Queen of Puddings.

½ pint milk.
2 oz. breadcrumbs.
2 eggs.
1 oz. butter or margarine.
1 oz. sugar.
2 oz. jam.

Pour the heated milk and butter over the breadcrumbs and sugar. Allow to stand for a few minutes. Add the beaten yolks and pour into a greased pie-dish. Bake in a moderate oven till set (20 minutes). Remove from the oven and spread with jam. Whisk the whites stiffly and pile on top. Return to a slow oven and bake till golden brown.

Rhubarb Tart.

6 oz. uncooked short pastry.
8 oz. rhubarb.
2 oz. sugar.
About 1 oz. water.

Place the prepared rhubarb, sugar and water in a pie-dish. Roll out the pastry and cover the dish. Bake in a moderate oven for about 30 to 40 minutes.

Rice Pudding.

1 pint milk.
1 oz. sugar.
2 oz. rice.
1 oz. butter or margarine.

Place the rice, milk, butter and sugar in a pie-dish. Bake in a slow oven for about 2 hours.

Rice Pudding (economical).

2 oz. skimmed milk powder.
1 pint water.
2 oz. rice.
½ oz. sugar.
½ oz. margarine.

Place the rice, sugar, margarine, and reconstituted milk in a pie dish. Bake in a slow oven for 3 hours, stirring occasionally during cooking.

Sago Pudding.

1 pint milk.
1½ oz. sugar.
2 oz. sago.

Soak the sago in the milk for 20 minutes. Add the sugar and bake in a slow oven for 30 minutes.

Semolina Pudding.

1 pint milk.
1½ oz. sugar.
2 oz. semolina.

Heat the milk and sprinkle in the semolina. Bring slowly to the boil and simmer till the grain is soft. Add the sugar and pour into a pie-dish. Bake in a moderate oven for about 20 minutes.

Suet Pudding, Plain.

2 oz. flour.
2 oz. breadcrumbs.
2 oz. suet.
1½ oz. sugar.
3½ oz. milk.
1 teaspoon baking powder.

Place all the dry ingredients together in a basin. Mix to a soft paste with the milk. Pour into a greased basin. Steam for 2½ hours.

Suet Pudding with Raisins.

2 oz. flour.
2 oz. breadcrumbs.
2 oz. suet.
2 oz. raisins.
1½ oz. sugar.
3½ oz. milk.
1 teaspoon baking powder.

Place the flour, breadcrumbs, suet, sugar, and baking powder in a basin and mix to a soft paste with the milk. Add the raisins and mix well. Pour into a greased basin. Steam for 2½ hours.

Suet Pudding with Sultanas (economical)

6 oz. flour.
2 oz. suet.
2 oz. sugar.
3 oz. sultanas.
5 oz. reconstituted skimmed milk powder.
1 teaspoon baking powder.

Mix together flour, suet, sugar, and baking powder. Make to a soft dropping consistency with reconstituted milk. Pour into a greased basin and steam for 3 hours.

Syrup Sponge Pudding (economical).

4 oz. flour.
2 oz. sugar.
2 oz. margarine.
2¾ oz. golden syrup.
½ oz. dried egg powder.
1 oz. reconstituted skimmed milk powder.
1 oz. water for reconstituting egg.
½ teaspoon baking powder.

Cream the margarine and sugar together and add the beaten reconstituted egg. Add the flour and baking powder and mix to a stiff dropping consistency with milk. Cover the sides and bottom of a basin with the syrup, put in the mixture and steam for 3 hours.

Tapioca Pudding.

1 pint milk.
1½ oz. sugar.
2 oz. tapioca.

Pour the milk over the tapioca and allow to stand for ½ hour. Add the sugar. Bake in a slow oven for 20 minutes.

Treacle Tart.

12 oz. uncooked short pastry.
1¾ oz. fresh breadcrumbs.
10 oz. golden syrup.

Line shallow tins with pastry. Pour in the golden syrup. Sprinkle with breadcrumbs. Bake in a hot oven for about 30 minutes.

Trifle.

$3\frac{1}{4}$ oz. sponge cake.
$2\frac{3}{4}$ oz. jam.
1 pint custard powder custard (recipe, p. 220).

Pour the custard over the sponge cakes which have been previously cut into slices and spread with jam. Allow to cool.

White Sauce, Sweet.

$\frac{1}{2}$ pint milk.
$\frac{3}{4}$ oz. flour.
1 oz. sugar.
$\frac{3}{4}$ oz. margarine.

Make the sauce in the same way as the savoury sauce (recipe p. 230), adding the sugar instead of salt.

Yorkshire Pudding.

$\frac{1}{2}$ pint milk.
4 oz. flour.
1 egg.
$\frac{3}{4}$ oz. dripping.
1 level teaspoon salt.

Salt the flour and break the egg into it. Beat till smooth, gradually adding about half the milk. Add the remainder of the milk and allow to stand for at least half an hour. Pour into a tin containing very hot dripping. Bake in a hot oven for 20 minutes.

Yorkshire Pudding (economical).

4 oz. flour.
1 oz. cooking fat.
$\frac{1}{2}$ oz. dried egg powder.
11 oz. water.
1 teaspoon baking powder.
1 teaspoon salt.

Mix together the flour, salt, baking powder, and dried egg powder. Add the water and beat well. Allow to stand for 1 hour. Pour into a tin containing the hot cooking fat. Bake in a hot oven for 30 minutes.

SAVOURY DISHES

Beef Steak Pudding.

6 oz. flour	suet crust.	8 oz. raw steak.
2 oz. suet		$\frac{1}{8}$ oz. flour.
About 4 oz. water		About 1 oz. water.
1 teaspoon baking powder		2 level teaspoons salt.
$\frac{1}{2}$ teaspoon salt		

Make the suet crust pastry and line a pudding basin, leaving sufficient for a lid. Cut the meat into slices and roll in the salted flour. Put into the basin. Add a little water and cover with the remainder of the pastry. Steam for about 2 hours.

Bread Sauce.

$\frac{1}{2}$ pint milk.
2 oz. fresh breadcrumbs.
$\frac{1}{4}$ oz. butter or margarine.
1 small onion.
$\frac{1}{2}$ teaspoon salt.

Put the milk and onion in a saucepan and bring to the boil. Add the breadcrumbs and simmer gently for about 20 minutes. Remove the onion and add the seasoning, stir in the butter and serve.

Buck Rarebit.

3 oz. cheese.
1 oz. butter or margarine.
⅝ oz. milk.
2 oz. white toast.
¼ oz. butter on toast.
1 egg.

Grate the cheese and make the toast. Mix together the cheese, butter and milk and spread evenly on the buttered toast. Place under the grill and cook until a light brown. Poach the egg and place on top of the toasted cheese.

Cheese Omelette.

2 eggs.
1½ oz. cheese.
¼ oz. butter or margarine.
1 level teaspoon salt.

Beat the eggs with the seasoning and add the grated cheese. Heat the butter in an omelette pan, pour in the mixture and stir till it begins to thicken evenly. While still creamy fold the omelette in two and brown lightly.

Cheese Pudding (economical).

1 oz. skimmed milk powder.
2 oz. dried egg powder.
2 oz. cheese.
2 oz. breadcrumbs.
11 oz. water for reconstituting egg and milk.
1 teaspoon salt.
¼ teaspoon mustard.

Heat the reconstituted milk to boiling. Add the breadcrumbs, grated cheese, salt, and mustard, and stir. Remove from the stove and add the reconstituted beaten eggs. Place in a dish, and brown under the grill for 10 minutes.

Cheese Sauce.

½ pint milk
¾ oz. flour
¾ oz. margarine } white sauce.
1½ oz. cheese.
1 level teaspoon salt.

Melt the fat in a pan. Add the flour and cook gently for a few minutes, stirring all the time. Add the milk and cook until the mixture thickens, stirring continually. Add the grated cheese and seasoning. Cook for a few minutes.

Cheese Straws.

2 oz. flour.
2 oz. butter or margarine.
3 oz. cheese.
½ an egg yolk.
About ¾ oz. water.
½ teaspoon salt.

Rub the butter into the flour. Add the grated cheese and seasoning. Bind to a stiff paste with the yolk and water. Roll out thinly and cut into narrow strips. Bake in a hot oven for about 10 minutes.

Curried Meat.

9½ oz. cooked meat.
2½ oz. dripping.
3 onions, peeled (12¾ oz.).
1 apple, peeled and cored (2½ oz.).
2 oz. sultanas.
½ oz. desiccated coconut.
1 oz. flour.
1 oz. curry powder.
1 pint stock or water.
2 level teaspoons salt.

Chop the onions and fry in the dripping. Add the chopped apple, sultanas and coconut, then the flour and curry powder and fry a minute or two. Add the stock and bring to the boil. Simmer for five minutes. Add the cooked meat which has been cut into pieces and reheat.

Egg Sauce.

½ pint milk
¾ oz. flour
¾ oz. margarine
} white sauce.
1 hard-boiled egg.
1 level teaspoon salt.

Make the sauce and add the chopped egg and seasoning.

Fish Cakes.

8 oz. steamed cod.
4 oz. mashed potato.
1 egg.
¼ oz. flour.
½ oz. margarine.
1 oz. dried breadcrumbs.
1 level teaspoon salt.

Heat the fat in a pan and add the coarsely chopped fish, potato and half the beaten egg. Mix well and allow to cool. Shape into six flat round cakes. Coat with flour, then with the other half of the egg and finally with dried breadcrumbs. Fry in very hot, deep fat for 2 minutes.

Fish Cakes (economical).

8 oz. steamed cod.
8 oz. mashed potato.
½ oz. dried egg powder.
1 oz. raw onion.
¼ oz. parsley.
1 teaspoon vinegar.
1 oz. browned breadcrumbs.
1 oz. water for reconstituting egg.
1 teaspoon salt.

Flake the fish and mix with the mashed potato, chopped parsley and onion, salt and vinegar. Shape into cakes and dip in the reconstituted egg and cover with breadcrumbs. Bake in a moderate oven for 30 minutes.

Fish Pie.

8 oz. steamed cod.
4 oz. mashed potato.
2 oz. suet.
1 egg.
7 oz. milk.
¾ oz. margarine.
¾ oz. breadcrumbs.
2 level teaspoons salt.

Chop the fish coarsely, and add the suet, potato, half the breadcrumbs and the seasoning. Stir in the beaten egg and the milk. Place in a greased pie-dish. Cover the surface with breadcrumbs and dabs of margarine. Bake in a moderate oven for about half an hour.

Hot Pot.

8 oz. raw steak.
2 onions, peeled (5 oz.).
2 carrots, scraped (3 oz.).
8 oz. raw potato, peeled.
About 4 oz. water.
2 level teaspoons salt.

Cut the steak into small pieces and arrange in layers with slices of carrot and onion. Add water and seasoning. Slice the potatoes and place on top. Bake in a moderate oven for about 1½ hours.

Irish Stew.

8 oz. neck of mutton (weighed with bone).
8 oz. potato, peeled.
4 oz. onion, peeled.
12 oz. water.
½ oz. pearl barley.
½ teaspoon salt.

Cut up the meat, potato and onion, and put into a saucepan. Add the water and barley and bring to the boil. Skim well and allow to simmer slowly for 1½ hours.

Kedgeree.

8 oz. smoked fillet, steamed.
2 oz. rice.
1 oz. margarine.
2 eggs (one hard boiled).
½ teaspoon salt.

Boil the rice. Melt the margarine and add the boiled rice, flaked fish, beaten egg and seasoning. Mix well and stir in the chopped hard-boiled egg. Put in a pie-dish and cook in a moderate oven for 20 minutes.

Macaroni Cheese.

½ pint milk.
1 oz. margarine.
1 oz. flour.
2 oz. macaroni.
3 oz. cheese.
2 level teaspoons salt.

Break the macaroni into small pieces and boil in salted water; drain well. Make a sauce of the milk, flour and margarine. Stir in three-quarters of the grated cheese. Add the boiled macaroni. Put the mixture in a pie-dish and sprinkle the remainder of the cheese on top. Brown under the grill.

Macaroni Cheese (economical).

3 oz. macaroni.
3 oz. cheese.
1 oz. flour.
¾ oz. margarine.
1½ oz. skimmed milk powder.
15 oz. water for reconstituting milk.
½ teaspoon salt.

Boil the macaroni in water until soft, and drain well. Melt the margarine in a saucepan, and stir in the flour and salt. Remove from the stove and add the reconstituted milk slowly. Add the cooked macaroni and about three-quarters of the grated cheese. Pour into a greased dish, and sprinkle the remainder of the cheese on top. Brown under the grill for about 10 minutes.

Omelette.

2 eggs.
1½ oz. butter or margarine.
About ½ oz. water.
1 level teaspoon salt.

Beat the eggs with the salt and add the water. Heat the butter in an omelette pan, pour in the mixture and stir till it begins to thicken evenly. While still creamy fold the omelette in two and brown lightly.

Onion Sauce.

½ pint milk
¾ oz. flour
¾ oz. margarine
} white sauce.
8 oz. onion, boiled.
1 level teaspoon salt.

Make the sauce and add the chopped onion and seasoning.

Potato Cakes (economical).

8 oz. mashed potato.
1½ oz. flour.
1 level teaspoon salt.

Mix the flour and salt with the mashed potato. Roll out, cut into cakes, and cook slowly on a hot plate or girdle.

Potato Soup.

13¼ oz. potatoes, peeled.
1 onion, peeled (4¾ oz.).
1 oz. dripping.
½ pint milk.
½ pint water.
2 level teaspoons salt.

Melt the fat in a pan. Slice the vegetables and fry in the fat. Add the water and seasoning. Bring to the boil, cover and simmer for an hour. Rub through a sieve, add the milk and reheat.

Sausage Roll.

5½ oz. uncooked flaky pastry.
2 oz. raw sausage meat.

Make the pastry, roll out and cut into squares of 4 inches. Place some sausage in the middle of each. Fold over and bake in a hot oven for 20 to 30 minutes.

Sausage Roll (economical).

10 oz. raw short pastry (economical).
5 oz. raw sausage meat.
¼ oz. flour.

Make the pastry, roll out, and cut into squares of 4 inches. Place a piece of sausage meat rolled in flour in the middle of each. Fold over the pastry, and bake in a hot oven for 30 minutes.

Scotch Egg.

3 eggs.
8 oz. raw sausage or sausage meat.
¼ oz. flour.
⅛ oz. beaten egg.
⅝ oz. breadcrumbs.

Hard boil the eggs, cool and remove shells. Skin the sausages and flatten each on a floured board. Dip each egg in flour and cover with the sausage meat. Brush with beaten egg and coat with crumbs. Fry in very hot, deep fat for about three minutes.

Scrambled Eggs.

2 eggs.
1 level teaspoon salt.
¾ oz. butter or margarine.
½ oz. milk.

Beat the eggs with the seasoning and add the milk. Heat the butter in a pan and add the beaten eggs and milk. Stir over a gentle heat until the mixture thickens.

Scrambled Eggs (with dried eggs).

½ oz. dried egg powder.
¼ oz. margarine.
1 oz. water for reconstituting the egg.
½ level teaspoon salt.

Melt the margarine in a saucepan and add the beaten reconstituted egg and salt. Stir over a gentle heat until the mixture thickens.

Shepherd's Pie.

6½ oz. beef, cooked.
3½ oz. onion, boiled.
18½ oz. potato, boiled.
2 oz. milk.
¾ oz. margarine.
About 6 oz. water.
2 level teaspoons salt.

Mince the meat and chop the onion. Moisten with water and add the seasoning. Mash the potatoes with the milk and margarine. Place the mince and onion in a pie-dish. Pile the potato on top. Bake in a hot oven till brown.

Steak and Kidney Pie.

7 oz. uncooked flaky pastry.
7½ oz. raw beef steak.
3½ oz. raw kidney.
About 2 oz. water.
2 level teaspoons salt.
¼ oz. flour.

Make the pastry. Cut the steak and kidney into pieces and roll in flour. Place with water and seasoning in the pie-dish. Cover with pastry. Bake in a hot oven for 20 minutes, then reduce the heat and continue cooking slowly for 2 to 2½ hours.

Toad-in-the-Hole.

½ pint milk
4 oz. flour
2 eggs
} batter.
8 oz. raw sausage or sausage meat.
2 oz. dripping.
2 level teaspoons salt.

Make the batter and pour into a pie-dish containing hot dripping. Skin the sausages and place them in the batter. Add the salt. Bake in a hot oven for about 40 minutes.

Welsh Rarebit.

3 oz. cheese.
1 oz. butter or margarine.
⅛ oz. milk.
2 oz. white toast.
¼ oz. butter on toast.

Make as for Buck Rarebit (p. 225), omitting the egg.

White Sauce, Savoury.

½ pint milk.
¾ oz. margarine.
¾ oz. flour.
1 level teaspoon salt.

Melt the fat in a pan. Add the flour and cook for a few minutes, stirring all the time. Add the milk and seasoning and cook gently until the mixture thickens, stirring continually.

RECIPES FOR HIGH CALORIE AND INVALID DIETS, AND DIETS SUITABLE FOR DISORDERS OF THE DIGESTIVE TRACT

BEVERAGES

Fortified Milk Mixture (400 Cals.).

½ pint liquid milk.
1 oz. full-cream dried milk.
½ oz. sugar or lactose.

Beat the milk powder into the liquid milk and add the sugar or lactose. This mixture may be flavoured with coffee, cocoa, Ovaltine, Bournvita, yeast extract, etc., and one egg or dried egg may be added if desired. The Calories would then be increased to 486.

Coffee (211 Cals. without cream ; 326 Cals. with cream).

Mix 1 oz. lactose with ¼ pint milk. Bring to the boil. Add a heaped dessertspoonful of coffee without stirring. Cook five minutes. Strain into a cup. Add 1 oz. cream if possible, stir and serve. This mixture may be taken iced through a straw if preferred.

Cocoa (237 Cals. without cream).

Use one heaped teaspoonful cocoa to ¼ pint milk and prepare in the usual way. Dissolve 1 oz. lactose in this. Add cream if possible. Chocolate may be used instead of cocoa.

Vanilla Egg Nog (293 Cals.).

Dissolve 1 oz. glucose or lactose in ¼ pint of milk, warming slightly if necessary. Beat up an egg and stir it into the milk mixture. Add vanilla to taste.

Treacle Egg Nog (257 Cals.).

Beat up an egg and mix it well with ¼ pint milk. Add a tablespoonful of treacle, and continue stirring till it is dissolved.

Milk and Cream Mixture (327 Cals. with 1 oz. glucose or lactose).

Dissolve glucose or lactose in ¼ pint milk. Add 1 oz. cream and stir well. Serve very cold. If desired a few drops of vanilla may be added.

Ice Cream (276 Cals. without cream; 391 Cals. with cream).

Half an egg.
½ oz. full-cream dried milk powder.
¼ pint of milk.
½ oz. sugar.

Warm the milk, beat in the milk powder, and pour on to the beaten egg and sugar. Pour mixture into a double saucepan and stir it over the fire until it thickens, but do not allow it to boil. Leave to cool, add a few drops of vanilla essence, and freeze. The addition of 1 oz. of cream to the mixture before it is frozen is an improvement.

Lemonade. High Calorie Recipe (234 Cals.).

1 oz. lemon juice.
Lemon rind.
2 oz. glucose.
5 oz. water.

Boil the water with lemon rind and glucose for about five minutes. Allow to cool a little, add the lemon juice, strain, serve very cold.

A quicker method is to dissolve the glucose in 1 oz. lemon juice mixed with 4 oz. cold water. Strain carefully through butter muslin if to be used for a patient with colitis or typhoid.

Orangeade (about 100 Cals.).

Squeeze a large orange, add a little lemon juice if desired. Strain, add water and glucose to taste.

SOUPS AND SAUCES

Cream of Chicken Soup (½ pint provides 127 Cals.).

Chicken carcass.
1 oz. flour.
1 oz. fat.
2 pints milk.
Salt and pepper, if allowed.

Cover chicken carcass and bones with milk. Stew gently, preferably in a double saucepan, for one to two hours, adding milk when necessary to keep the quantity constant. Strain off liquid and thicken with flour and fat. Add seasoning as allowed. Serve with cream crackers or dry toast.

Cream of Tomato Soup (258 Cals.).

4 oz. tomato juice.
1 oz. cream.
1 oz. lactose.
Salt and pepper if allowed.

Warm the tomato juice and dissolve the lactose in it. When ready to serve stir in the cream, but do not allow to boil. Season well.

Tomato Soup. High Calorie and Low Fat Recipe (157 Cals.).

4 oz. tomatoes.
1 oz. lactose.
4 oz. water.
½ oz. cornflour.
Salt and pepper if allowed.

Boil the tomatoes in the water until soft. Sieve them. Add the lactose and stir till dissolved. Mix the cornflour with a little water. Pour the tomato purée over it, stirring well. Return to the saucepan, stir until thickened. Allow to cook a few minutes, then serve.

Plain White Sauce (127 Cals.).

½ oz. flour or cornflour.
¼ pint milk (skimmed if for patients on low fat diets).

This is very easy to make, and is more readily digested than if made with fat.

Mix the flour or cornflour with a little cold milk. Boil the remainder, pour over the paste, stirring well. Return to the saucepan, stir until the mixture thickens and tastes cooked (about five minutes), or leave to cook in a double saucepan. Use seasoning as allowed.

White Soup (suitable for gastric ulcer and colitis patients).

5 oz. milk.
¼ oz. butter or margarine.
¼ oz. flour.
Salt.
About 2 oz. of sieved carrots, potatoes, peas, spinach or tomatoes, or yeast extract to taste.

Melt the butter and stir in the flour to a smooth paste. Add the milk gradually, stirring to avoid lumps. Then add the sieved, cooked vegetable and continue cooking for a few minutes after the mixture has boiled. If tomatoes are used the milk mixture should be thoroughly cooked first, and the tomato then added slowly and carefully to avoid curdling and not allowed to boil. If potatoes are used it may be necessary to increase the amount of milk.

FISH

Fish Custard (253 Cals.).

4 oz. cooked fish (smoked haddock may be used if salt is not restricted).
¼ pint milk.
½ egg.
Little salt.

Flake fish. Beat up egg and add milk, and a little salt if allowed. Pour over the fish in a fireproof dish and bake in a pan of water in a cool oven for 30 to 40 minutes until set.

Steamed Fish Cream (238 Cals.).

Proceed as for fish custard, sieving the fish if preferred, but pour the mixture into greased moulds. Cover with greaseproof paper, and steam gently until set. Serve with white sauce.

CHICKEN

Chicken or Rabbit Custard (244 Cals.).

Make as fish custard, using 2 oz. minced chicken or rabbit instead of fish.

Chicken Jelly (250 Cals.).

1½ oz. chicken.
2 sheets or ¼ oz. gelatine.
1 oz. cream.
¼ pint chicken stock.
Salt to taste if allowed.

Put chicken twice through the mincer or rub through a sieve. Heat the chicken stock, with seasoning if allowed. Remove from the fire, add the gelatine, and stir in the chicken. Place in a mould, add the cream, and turn out when set.

Meat or Yeast Extract Custard (82 Cals., *i.e.* the value of 1 egg).

1 egg.
¼ pint well-flavoured meat or yeast extract or beef tea.

Beat up the egg. Mix well with the meat or yeast extract or beef tea. Bake in a fireproof dish placed in a pan of water in a cool oven for about 40 minutes until set.

PUDDINGS

Apple or Apricot Meringue (50–100 Cals.).

¼ lb. stewed apple or stewed and sieved dried apricots.
White of 1 egg.
Sugar.

Invalid and Low Fat Recipe.—Place the fruit in a pie-dish. Whip the egg white till stiff, then add a little sugar to it. Pile on the fruit. Brown in a quick oven, or under the grill. If preferred, the egg white may be folded into the fruit and the pudding served as a whip.

Low Residue Recipe. May be made suitable for convalescence from colitis or gastric ulcer by sieving the fruit before use.

Bread-and-Butter Pudding (283 Cals.).

2 slices of bread and butter.
⅓ pint milk.
1 egg.
Sugar to taste.

Cut the bread and butter into small squares and place in a pie-dish. Beat up the egg and mix well with the milk and sugar. Flavour with vanilla or cocoa if desired. Pour over the bread and allow to stand half an hour if possible. Stand in a pan of water in a cool oven and bake 30 to 40 minutes until set.

Orange Mould. Individual serving (206 Cals.).

3 oz. strained orange juice.
Rind of half a lemon.
½ oz. cornflour or ¼ oz. arrowroot.
1 oz. glucose.

Boil ¼ pint of water with the lemon rind and glucose until the volume is reduced by half. Mix the cornflour or arrowroot with a little water to a smooth paste. Strain the water flavoured with lemon rind over this, stirring well. Add the orange juice, return to the fire, and stir until the mixture is clear. This mixture can be set with one to one and a half sheets gelatine instead of cornflour if preferred. Other fruit juice may be used, but for patients suffering from hyperchlorhydria, acid fruits must be avoided.

Queen of Puddings (about 450 Cals.).

2 oz. bread-crumbs.
¼ pint milk.
1 egg.
Honey or jelly.
Sugar to taste.

Put the bread-crumbs into a buttered pie-dish. Separate the yolk from the white of egg. Beat the yolk, mix with the milk and add sugar or glucose to taste. Pour over the crumbs, place in a pan of water in a slow oven and bake until set. Spread honey or jelly over the top (red currant may be used if not intended for a patient suffering from hyperchlorhydria), or jam if there is no digestive disturbance. Beat the white of egg until stiff, add one teaspoonful of sugar. Pile on the pudding and brown in a quick oven or under the grill. One teaspoonful of cocoa and a few drops of vanilla may be mixed with the egg yolk and milk if desired to make a chocolate pudding; golden syrup or honey should then be used instead of jelly.

Trifle (506 Cals.).

2 sponge cakes or 2 slices plain cake.
¼ pint boiled custard (made with egg or custard powder).
Vanilla.
Jelly or Jam.

Cut the cake crosswise into three. Spread with some of the jelly or jam, and put together again. Cut downwards into four. Lay the pieces in a glass dish. Add hot water to the rest of the jelly or jam, and pour over the cake. Make an egg or custard powder custard, flavour with vanilla, pour over, and leave to cool. Decorate with jelly before serving.

Compôte of Fruit (280 Cals.).

¼ lb. fruit (fresh, or dried soaked fruit).
½ pint water.
2 oz. glucose.
Lemon rind.

Boil the glucose in the water with lemon rind until the volume is reduced by half. Put in fruit and cook until soft but whole. Remove lemon rind. Serve cold with custard or cream.

N.B.—Fresh peaches or apricots make an excellent compôte. To peel them, put them on a fork and place them in boiling water for a minute. The peel will then come off easily.

Milk or French Toast (328 Cals.).

¼ pint milk.
3 slices bread.

Toast the bread to a delicate brown, and put it into a covered dish. Heat the milk, season it with a saltspoonful of salt, and pour over the toast. A little butter may be spread on each slice before the milk is added. White sauce may be used instead of milk if preferred.

Pain Perdu.

Dip thick slices of stale, crustless bread in sweetened egg and milk. Fry in fat. While the bread is still hot, sprinkle it with castor sugar and cinnamon if desired. Serve with compôte of fruit or rings of tinned pineapple.

RECIPES FOR LOW CALORIE DIETS
(also suitable for diabetic diets)

SOUPS

Note.—Clear meat or vegetable stocks are suitable, but they must be carefully freed from fat (see p. 241).

Mixed Vegetable Soup.

Use vegetables in season (not potatoes or pulses) and a little onion or leek. Chop finely and cook in water or chicken stock until tender. Season and add a little chopped parsley before serving.

Celery or Mushroom Skimmed Milk Soup (for diabetics, see p. 250).

$3\frac{1}{2}$ oz. skimmed milk.
Head of celery, or about 2 oz. mushrooms.
Parsley or watercress.
Salt and pepper.

Stew the celery in sufficient water to cover, until tender, then strain through a fine sieve. Add the skimmed milk, seasoning and a little finely chopped parsley or watercress. Bring slowly to the boil and serve immediately.

Mushrooms may be used instead of celery. Prepare in the same way, slicing the mushrooms finely instead of sieving.

Asparagus Soup.

$\frac{1}{2}$ pint stock.
6 to 8 sticks of fresh asparagus, or small tin of asparagus.
Salt and pepper.

Boil the asparagus in the stock until the tips are tender. Remove these and set aside. Continue boiling the rest of the asparagus until it is soft, then rub it through a sieve. Reheat this with the soup and add the tips. Season well and serve. If tinned asparagus is used the tips should be removed at once, and the stalks, liquor from the tin, and $\frac{1}{4}$ pint stock cooked together. Then proceed as above.

Marrow or Cucumber Soup.

$\frac{1}{4}$ pint stock.
$\frac{1}{4}$ lb. cooked marrow or cucumber.
Bay leaf, shred of onion.
Salt and pepper.

Cook the stock for about 10 minutes with the onion and bay leaf. Sieve the marrow or cucumber and add to the stock. Cook another 10 minutes. Remove the bay leaf, season well and serve. Garnish with chopped parsley if desired.

Spinach or Cauliflower Soup.

$\frac{1}{2}$ pint stock or skimmed milk.
1 small cauliflower or
1 lb. spinach (or small tin).
Shred of onion if desired.
Salt and pepper.

Bring the stock to the boil with the onion, put in the cauliflower or well-washed spinach, and cook till tender. Sieve, season well, reheat and serve. If skimmed milk is used, cook the vegetable in very little water and add to the skimmed milk when sieved. Reheat and serve.

Celery Soup.

½ pint stock.
Outside stems of a head of celery.
Few shreds of onion.
Salt and pepper.

Clean the celery and cut in small pieces crosswise. Cook with the onion in the stock until tender. Season well and serve.

Cabbage Soup.

½ pint stock.
4 oz. raw cabbage.
Few shreds of onion.
Salt and pepper.

Shred the cabbage finely. Cook in the stock with the onion until tender. Season well and serve.

PUDDINGS

Lemon Jelly.

Boil ½ pint water with lemon rind for about five minutes. Dissolve one and a half sheets or ¼ oz. of gelatine in this after removing from the fire. Add the juice of a good-sized lemon and one or more crushed saccharine tablets to taste. Add lemon colouring. Strain, pour into a mould. Turn out when set. Decorate with stewed cranberries sweetened with saccharine if desired. Peppermint essence may be used instead of lemons if preferred.

Coffee Jelly.

Make ½ pint well-flavoured coffee. Sweeten with half or one saccharine tablet to taste. Dissolve one to one and a half sheets or ¼ oz. of gelatine in the liquid off the fire. Strain and pour into a mould. Turn out when set.

Agar-Agar Jelly.

½ teaspoonful powdered agar-agar.
¾ pint water and flavouring or coffee.

Mix the agar to a smooth paste with a little of the water or coffee. Add the rest of the water, and boil 10 minutes. Strain, colour, and sweeten with saccharine to taste. Add flavouring if the jelly has been made with water. Pour into moulds, and cool at room temperature. This recipe may be adapted for certain diabetic diets by reducing the amount of water and replacing it with cream.

Cranberry Whip.

Stew cranberries in water until soft. Add a pinch of bicarbonate of soda to counteract some of the acidity. Remove the scum. Sweeten with saccharine to taste. Strain off the juice. Fold in a stiffly beaten egg white and serve immediately.

Stewed Rhubarb.

Cook rhubarb in water as cranberries, adding bicarbonate of soda if very tart. Sweeten with saccharine to taste.

Orange Jelly. See p. 252.

Fruit Jelly. See p. 253.

Fruit Whip. See p. 253.

Skimmed Milk Jelly. See p. 248.

Skimmed Milk Junket. See p. 248.

BULKY SALADS AND SAVOURY DISHES PROVIDING ABOUT 80 CALORIES

Egg Salad.

Cut up 1 hard-boiled egg and serve with lettuce, tomato, celery, cucumber, cress and chopped chives.

Stuffed Egg.

Cut a hard-boiled egg in half, remove the yolk carefully, and mix with a little anchovy essence, or tomato juice and seasoning, or skimmed milk and seasoning. Replace in the white, and serve on lettuce and tomato with pimento if desired.

Sardine Salad.

Remove as much oil as possible from 1 oz. sardines. Place on a lettuce and tomato salad. Decorate with pimento if desired.

Cheese Salad.

Mix 1 oz. home-made sour milk cheese or cheese such as York, Bondon, or Little Wilts, with enough tomato juice and seasoning to mould into a ball. Serve in a bed of lettuce decorated with tomato, cucumber, etc.

Lobster or Crab Salad.

Serve 2 oz. lobster or crab on a salad with vinegar, if desired.

Chicken Jelly.

Make aspic, or jelly with ¼ pint of tomato juice, or stock or chicken broth carefully freed from fat, and 1 sheet or ⅛ oz. of gelatine. Season well. Decorate a mould with tomato, cucumber, diced carrots, or similar vegetables in season. Dice 1½ oz. chicken (or rabbit) and place on the vegetables. Pour in the jelly and leave to set. Serve on lettuce and tomatoes.

Baked Tomato and Egg.

Remove the centre from a large tomato. Slip in a whole egg and bake in a moderate oven until set. This may be serve with whole tomatoes baked in a little water. They must be pricked on top to prevent them from bursting.

Baked Egg and Mushrooms.

Stew some sliced mushrooms in a little water. Put into a small fireproof dish. When nearly cooked add an egg, seasoning, and bake until set. Tomatoes may be used as well as, or instead of, the mushrooms.

Stewed Sweetbreads and Mushrooms.

Blanche and stew 1½ oz. sweetbreads in water or skimmed milk with mushrooms. Season well before serving.

Meat Extract Custard. See p. 233.

LOW RESIDUE RECIPES

Flour of Oatmeal.

1½ oz. flour of oatmeal.
1 pint water.
Salt.

Mix the flour of oatmeal to a smooth paste with a little of the water. Bring the rest of the water to the boil, and stir in the oatmeal and a pinch of salt. Continue simmering, stirring occasionally, for about half an hour, until the mixture tastes cooked. If flour of oatmeal is not available, ordinary porridge may be rubbed through a fine sieve and reheated before serving.

Strained Marmalade.

Warm marmalade in a saucepan until liquid, stirring to prevent its burning, or in a fireproof dish in the oven. Pour through a fine sieve and allow to cool. The rind left behind may be used for puddings, etc., for those not requiring special diets. Plum and other stone fruit jams may be strained in the same way.

HIGH RESIDUE RECIPE

Quaker Oats Fingers.

4 oz. Quaker oats.
2 oz. margarine.
3 oz. sugar.
1 teaspoonful treacle or golden syrup.

Melt the margarine, treacle and sugar in a saucepan. Add the Quaker oats and stir all together for a few minutes over gentle heat. Then spread thinly on a greased baking tin and bake 15 to 20 minutes in a moderate oven until golden brown. Mark out in neat fingers and leave in the tin until cool. Cut up and store in a tin.

FRACTIONAL TEST MEAL

Gruel.

1 to 2 oz. fine oatmeal.
2 pints water.

Simmer the oatmeal in the water until the volume is reduced to 1 pint. Strain through fine muslin or a fine sieve. Bring to blood heat to serve.

RECIPES FOR LOW FAT DIETS

Where quantities are given, the recipes below are sufficient for 1 *good or* 2 *small servings. They do not contain more than* 1 *gram of fat.*

Fortified Skimmed Milk Mixture (300 Cals.).

½ pint water.
2 oz. dried skimmed milk.
1 oz. glucose or lactose.

Sprinkle the dried skimmed milk on the warm water. Beat well and add the glucose or lactose. This mixture may be flavoured with coffee or yeast extract, or used as the basis for soup.

SOUPS MADE FROM STOCK OR WATER

To clear stock from fat.—Allow stock to stand till cold. Remove carefully with a spoon as much fat as possible and absorb the remainder by running pieces of clean white paper across the surface until no fat spots can be seen on a fresh piece of paper. If jellied, the soup must be warmed before using the paper.

Potato Soup.

2 good sized potatoes.
¾ pint stock freed from fat, or water.
Small onion and other vegetables to flavour.
Herbs or parsley.
Salt and pepper.

Wash and prepare vegetables, and cut in pieces. Stew in stock or water. When cooked, sieve and season. Finely chopped parsley may be added just before serving or herbs tied up in muslin may be cooked in the soup.

Tomato Soup. (See also p. 232.)

½ lb. tomatoes.
¾ pint stock freed from fat, or water.
¼ oz. flour or cornflour.
Salt and pepper.

Cook the tomatoes in the stock or water. Mix the cornflour to a smooth paste with a little cold water in a basin. Sieve the cooked tomatoes and pour them over the cornflour, stirring them well. Return the soup to the saucepan, continue stirring for about five minutes, until the soup tastes cooked. Season with salt and pepper and serve. Tomato juice or sauce, or tinned tomatoes may be used instead of fresh fruit.

SKIMMED MILK SOUPS (See also p. 236.)

Skimmed milk, fresh or dried, may be used for low-fat soups, sauces, fish, chicken or sweet dishes.

"Cream" of Potato Soup.

1 good sized cooked potato.
½ pint skimmed milk.
¼ oz. patent barley flour or cornflour.

Bring the skimmed milk nearly to the boil. Sieve the potato and add it to the milk. Cook them together for a few minutes, stirring all the time. Mix the barley or cornflour to a smooth paste in a basin with a little cold skimmed milk or water. Pour the potato and milk over the paste; stir well. Return to the fire. Stir for about five minutes until cooked. Season, and serve with chopped parsley to flavour if desired.

Other Vegetable Soups.

Any cooked sieved vegetables, for instance, carrots, turnips, peas, cauliflower, may be used with skimmed milk to make soup. Patent barley for thickening gives a rather richer flavour than cornflour.

If tomatoes are used, the milk should be thickened first and added very gradually off the fire to the sieved tomatoes to prevent its curdling, or a pinch of bicarbonate of soda may be added to the tomatoes.

Soup containing 3½ oz. Skimmed Milk.

Make as above, using 3½ oz. skimmed milk and ⅕ oz. patent barley or cornflour.

Meat or Yeast Extract and Skimmed Milk Soup.

Flavour hot skimmed milk with meat or yeast extract to taste. Thicken with cornflour or barley if desired.

SAUCES

Tomato Sauce.

Make as for tomato soup (p. 241), but use 1 oz. flour or cornflour to thicken instead of ¾ oz.

White Sauce.

Make as for plain white sauce (p. 232), using skimmed milk instead of whole milk. Onion may be stewed in this if desired. Chopped parsley, or meat or yeast extract, or tomato ketchup, may be added just before serving to vary the flavour.

Egg Sauce.

The white of one hard-boiled egg may be chopped and added to the above sauce if protein is not strictly limited.

Boiled Dressing.

¼ tablespoon salt.
1 teaspoon mustard.
1½ tablespoons sugar.
Few grain cayenne.
¼ pint skimmed milk.
2 tablespoons vinegar.
½ oz. flour or cornflour.

Mix the dry ingredients, then add milk very slowly. Cook over boiling water until the mixture thickens. Add vinegar, strain, and cool.

FISH

Suitable fish : haddock, fresh or smoked, cod, skate, sole, lemon sole, plaice.

"Creamed" Fish.

Flaked cooked fish. White sauce (see recipe, p. 242).

Mix the fish with the sauce, season well. Reheat, pile on a plate, and serve immediately, with dry toast if desired. Anchovy flavouring or finely chopped parsley may be added to the sauce if desired.

Scalloped Fish.

Proceed as for "creamed" fish, then place in a shell or fireproof dish, cover with browned bread raspings, reheat in the oven and serve.

Fish Pie.

Fill a pie-dish with "creamed" fish (see above). Add chopped parsley if desired. Cover with mashed potato moistened with skimmed milk. Brown under the grill or in a hot oven, and serve.

Baked Fish with Tomatoes.

Place whole fish or fillets in a fireproof dish. Add skimmed milk to moisten. Slice tomatoes crosswise and cover the fish with these; bake until the fish comes away easily from the bone. Partly cooked sliced mushrooms or onions may be used as well as the tomatoes, or in place of them if preferred.

Kedgeree.

Fillet of cooked smoked haddock or other fish.
Equal quantity of boiled rice.
White sauce (see recipe, p. 242).
White of hard-boiled egg.
Salt and pepper.

Chop the egg white and mix with the other ingredients. Season well and serve very hot with sippets of dry toast.

Fish Salad.

Flake some white fish, mix with boiled dressing (p. 242) or tomato juice, and serve on lettuce, cress, or other salad.

Fish in Aspic.

Make aspic in the usual way, or use fish stock and add one sheet or $\frac{1}{8}$ oz. of gelatine to $\frac{1}{4}$ pint. Season well. Decorate two individual moulds with cooked peas, diced cooked carrots, or other vegetables. Add well-seasoned cooked fish or pieces of lobster. Pour the aspic or fish stock carefully on to these and leave to set in a cool place. Turn out and serve with lettuce, cress, or other salad, and special boiled dressing (see recipe, p. 242) if desired.

CHICKEN, RABBIT, TRIPE, STEAK

"Creamed" Chicken or Rabbit.

3 tablespoons minced or diced chicken or rabbit.
1 tablespoon boiled rice.
Skimmed milk white sauce (see recipe, p. 242).
Sliced stewed mushrooms, tomatoes, chopped capers, or peppers to flavour if desired.
Salt and pepper.

Mix the chicken or rabbit with the rice and enough sauce to moisten. Add mushrooms or other vegetables. Heat and serve with sippets or on a slice of dry toast.

Chicken Jelly (see p. 238).

Stewed Tripe and Onions.

6 oz. tripe.
¾ pint skimmed milk.
¼ oz. flour or cornflour.
A small onion.
Salt and pepper.

Remove all fat from the tripe and cut in neat pieces about 1½ inches square. Peel the onion and slice it crosswise. Place these in enough skimmed milk to cover and bring gently to the boil. Simmer for at least two hours until tender, adding more skimmed milk if necessary. Thicken with ¼ oz. cornflour mixed to a paste in cold skimmed milk or water. Stir until the sauce tastes cooked. Season. Serve with dry toast and parsley to decorate.

Stewed Tripe and Tomatoes.

6 oz. tripe.
3 medium tomatoes or a small tin of tomatoes.
Half a small onion.
¼ oz. flour or cornflour.
¾ pint water or stock.

Remove all fat from the tripe, add tomatoes, and sliced onion, cover with water or fat-free stock and stew until tender, which will take at least two hours. Thicken the sauce with the cornflour mixed to a smooth paste with cold water. Stir until the sauce tastes cooked. Season, adding a little tomato ketchup, meat or yeast extract if desired. Serve with dry toast. Remove onion before serving if used for light diet.

"Pan broiled" Steak.

Trim the fat carefully off a thin cut of rump steak. Heat a frying-pan and cook the steak in it, turning it over frequently. Use meat extract for gravy if required.

VEGETABLES AND MEAT SUBSTITUTES

Macaroni and Tomatoes.

6 sticks macaroni.
¼ oz. flour or cornflour.
Salt and pepper.
¼ lb. tomatoes or a small tin of tomatoes.

Cook the macaroni in boiling salted water until tender. Boil the tomatoes in water and when cooked rub through a sieve. Add

some of the water in which they were boiled so that the total volume is ¼ pint. Thicken with the cornflour, season to taste, pour over the macaroni and serve. ½ oz. of rice may be substituted for the macaroni.

Baked Tomatoes.

Make a small hole in the top of the tomatoes with a knife or fork. Place in a fireproof dish with a little water. Bake about 10 to 15 minutes, until soft.

Stuffed Tomatoes.

2 large tomatoes
About 2 tablespoonfuls of boiled rice.
White of a hard-boiled egg.
Cooked vegetable.
Salt and pepper.

Cut the tops off the tomatoes. Scoop them out carefully. Chop the egg white, mix with the rice, the inside of the tomatoes, and some chopped cooked beetroot, carrot, or other vegetables. Season well. Stuff the tomatoes with the mixture. Serve cold on lettuce or cress, or bake in the oven in a little water for about 15 minutes, and serve on small rounds of dry toast or in a bed of boiled rice.

Stuffed Egg Whites.

Whites of 2 hard-boiled eggs.
About 2 tablespoons of boiled rice.
Cooked vegetables and tomatoes.

Cut the hard-boiled eggs in half, lengthwise. Scoop the yolks out carefully as these must not be used for low fat diets. Mix the rice with the vegetables and a little vinegar if desired. Fill the egg whites, piling the stuffing up. Serve on salad.

Celery and Apple Salad.

Celery
Apple.
Seedless raisins.
Lettuce.

Chop the celery and peel and chop the apple. Mix, add a few seedless raisins, and serve on a bed of lettuce, with vinegar and sugar if desired, or boiled dressing, p. 242.

PUDDINGS

Skimmed Milk Custard.

1 oz. custard powder.
1 pint skimmed milk.
Sugar.

Stir the custard powder to a smooth paste in a little of the cold skimmed milk. Sweeten the remainder and bring to the boil, pour over the custard powder, stir well, and return to the fire. Cook in a double saucepan, or stir all the time, until the custard tastes cooked. It may be flavoured with strong coffee or coffee essence to make a coffee custard.

Coffee Blancmange.

½ oz. cornflour.
½ pint skimmed milk.
Strong coffee or coffee essence.
Sugar.

Mix the cornflour to a smooth paste in a little of the skimmed milk. Bring the remainder to the boil in a double saucepan with about a dessertspoonful of sugar (one or more tablespoonfuls of glucose may be substituted if extra Calories are required). Pour over the cornflour, stirring all the time. Return to the saucepan. Add coffee or coffee essence to taste. Stir well, and leave 5 to 10 minutes until cooked. Pour into a mould and turn out when cold.

"Creamed" Rice and Banana.

¾ oz. rice.
½ pint skimmed milk.
1 dessertspoonful of sugar.
1 or 2 bananas.
Jam.
Lemon rind.

Wash the rice. Place in a double saucepan with the skimmed milk, sugar, and lemon rind. Stew for one to two hours until soft. Remove the rind. Place in a glass dish or individual glasses. When cool, cover with jam. Slice banana on top. Add a little lemon juice if not to be used at once. Decorate with jam or cherries and angelica.

Trifle.

Angel cake (p. 247) or plain buns.
Custard made from skimmed milk and custard powder (see p. 245).
Jam.
Sugar.

Spread slices of angel cake or buns with jam. Make into sandwiches, cut into squares and place in a glass dish. Make a custard with custard powder and skimmed milk, pour it hot over the cake. When cool decorate with cherries and angelica. Marshmallows cut in pieces may also be used on top if desired, and may be browned under the grill.

Fruit Whip.

Stewed or tinned fruit, or fresh strawberries or raspberries.
White of 1 egg.
Sugar.

Sieve the fruit, draining off any juice, and sweeten to taste. Beat the egg white until stiff. Fold it into the fruit. Pile in individual glass dishes and serve at once.

Apple Charlotte.

½ lb. cooking apples.
1 oz. sugar.
1 teacupful bread-crumbs.
Golden syrup.
The grated rind of half a lemon or a few cloves.

Cook the apples. When they are reduced to a soft pulp, add the lemon rind and sweeten to taste. Cover the bottom of a pie-dish with bread-crumbs, cover this with a layer of apple pulp, and continue with alternate layers of bread-crumbs and apple, finishing with a layer of bread-crumbs. Place golden syrup or brown sugar on the top, and bake in a moderate oven for about 30 minutes.

Apple Meringue (see p. 234).

Fruit Mould.

¾ pint fruit juice or pulp.
Sugar.
1 oz. cornflour or arrow-root.

Mix the cornflour with cold water to a smooth paste. Heat the fruit juice or pulp, sweetened to taste, and pour slowly over the cornflour, stirring all the time. Return to the fire and stir for about five minutes until cooked. If no fruit juice is available, boil some lemon rind with sugar and water, remove the rind, add lemon juice to taste, and continue as above.

Fruit Sago.

¾ pint fruit juice or pulp.
Sugar.
1 oz. sago or seed tapioca.

Bring the fruit juice or pulp to the boil and sweeten to taste. Add the sago or tapioca and cook in a double saucepan, stirring occasionally. In about 20 minutes the mixture will be clear and cooked. Allow to cool and place in a glass bowl or individual dishes. Decorate with fruit if desired and serve.

Semolina Whip.

Make as fruit sago, substituting semolina for sago. When cold, whip until frothy.

Orange Custard.

1 or 2 oranges.
¾ pint skimmed milk.
1 oz. custard powder.
Sugar.

Peel the oranges and slice them crosswise. Cover them with sugar or glucose and allow to stand in a glass bowl. Make custard with skimmed milk and custard powder and sweeten to taste. Cool and pour over the orange and serve very cold, decorated with cherries and grated orange peel if desired.

Banana Custard.

Make as above, substituting sliced banana and jam for orange.

CAKE AND TOAST (Family Recipes)

Angel Cake.

Whites of 6 eggs.
1 teaspoonful of cream of tartar.
4 oz. castor sugar.
3 oz. flour.
¼ teaspoonful salt.
1 teaspoonful vanilla.

Beat the egg whites until stiff. Sift the cream of tartar and the flour and add the sugar and salt. Fold into the egg whites. Add the vanilla. Bake 45 to 50 minutes in an ungreased tin in a moderate oven. When the cake begins to brown cover it with greaseproof paper.

Parkin.

2 oz. medium oatmeal.
2 oz. flour.
¼ teaspoon ground ginger.
Skimmed milk.
¼ teaspoon ground cinnamon.
¼ teaspoon bicarbonate of soda.
1 oz. sugar.
1½ oz. black treacle and syrup.

Heat the syrup and treacle; mix the dry ingredients, and add the melted syrup. Heat the milk and add sufficient to make a stiff consistency. Bake in a flat tin in a moderate oven.

Toast Melba.

Cut thin slices of bread. Place in a baking tin in a slow oven, removing directly they are crisp and a golden brown.

LOW FAT RECIPES SPECIALLY SUITABLE FOR PATIENTS SUFFERING FROM SPRUE

Individual Servings

Salisbury Steak.

Mince raw lean steak, removing any tough parts. Season and shape into a patty. Cook very lightly in a hot frying-pan without fat.

Skimmed Milk Jelly.

¼ pint skimmed milk.
1 to 1½ sheets or ¼ oz. gelatine.
White of 1 egg.
1 oz. glucose or lactose.
Lemon rind, vanilla, or coffee essence.

Heat the skimmed milk till nearly boiling, adding glucose and lemon rind or coffee essence if desired. Remove from the fire and stir in the gelatine, previously cut into shreds, until dissolved. Strain and cool, add beaten egg white, and leave to set in a mould. If vanilla is used instead of lemon rind or coffee essence, add it after straining. This mixture may be frozen to make vanilla or coffee ice.

Skimmed Milk Junket.

Fresh raw skimmed milk should be used. Make as ordinary junket, using glucose to sweeten, and vanilla or coffee to flavour.

Orange Jelly.

Juice of 1 large or 2 small oranges.
Lemon rind.
1 egg white.
1 to 1½ sheets or ¼ oz. gelatine.
Glucose to taste.

Boil 4 oz. water with 1 oz. glucose and a piece of lemon rind until the volume is reduced by about half. Remove from the fire and dissolve the gelatine in it, mix with the orange juice and strain. When cool add the egg white. Stir up thoroughly and leave to set. This jelly may be whipped just before setting to form a snow, or it may be frozen and served as orange ice.

Baked Banana.

Cut the skin of a banana lengthwise to prevent its bursting. Lay it in a fireproof dish or on a baking-tin. Bake in a moderate oven for 20 to 30 minutes until quite soft. Serve warm in skin.

Banana Whip.

1 large banana. Glucose to taste.
White of 1 egg.

Sieve a banana, add strained lemon juice and glucose to taste. Colour with cochineal and fold in the beaten white of an egg. Serve in a glass dish and decorate with red-currant jelly.

Vanilla Whip.

Dissolve a tablespoonful of glucose in a glass of skimmed milk. Add vanilla to taste. Chill. Stir in a stiffly beaten-up egg white just before serving.

Custard (for Sprue in convalescent stage only).

Make boiled or baked egg custard in the ordinary way, using skimmed milk instead of whole milk. This dish is not suitable for ordinary low fat diets because egg yolk contains fat.

Yeast Extract Soup with Skimmed Milk.

Add yeast extract to hot skimmed milk, and season to taste.

Spinach Soup. See p. 236.

RECIPES FOR DIABETIC DIETS

For recipes of dishes with negligible food value, see p. 236.

SOUPS CONTAINING 5 g. C.

Clear Vegetable Soup. C., 5 g.

½ pint stock.
3 oz. cooked carrots and leeks.
1½ oz. cooked turnips and onions.
1 stick celery.
Salt and pepper.

Cook the stock with a stick of celery cut in small pieces for 15 minutes. Add the other vegetables, cut very fine or shredded, and cook until they are all tender. Season well and serve.

Carrot or Leek Soup. C., 5 g.

¼ pint meat stock.
4 oz. sieved cooked carrots or leeks.
Salt and pepper.

Add the carrots or leeks to the stock, heat, season to taste, and serve. Finely chopped parsley may be added if desired.

Cauliflower or Cucumber Milk Soup. C., 5 g.; P., 3·3 g.; F., 3·7 g

A small cauliflower or cucumber.
3½ oz. milk.
Salt and pepper.

Prepare and partially cook a small cauliflower in water in the top part of a double saucepan. Add the milk and finish cooking over boiling water. Sieve the cauliflower, return it to the soup, reheat and season to taste. Sliced cucumber may be substituted for cauliflower if desired.

Celery or Mushroom Milk Soup. C., 5 g.; P., 3·3 g.; F., 3·7 g.

Make as described on p. 236, using whole milk instead of skimmed.

FISH AND MEAT

Fish in Casserole. C., 5 g.; P., 16 g.; F., 10 g.

2½ oz. filleted sole, plaice, or dab.
3½ oz. milk.
¼ oz. butter or margarine.
Seasoning.
Slice of lemon.
Chopped parsley.

Wipe the fish and sprinkle with pepper and salt. Place in a small greased casserole and cover with the milk and dabs of the butter. Cook in a moderate oven 20 to 30 minutes. If a casserole is not available the fish can be cooked between two plates over a saucepan of boiling water. Garnish with lemon and chopped parsley, and serve immediately.

Cold Fish Soufflé. C., 1·4 g.; P., 29 g.; F., 3 g

4 oz. cooked fish.
1 anchovy.
Half hard-boiled egg.
1 oz. fish stock.
1 oz. milk (or whipped cream, making the recipe: C., 0·7 g.; P., 28·5 g.; F., 15·6 g.).
1 sheet gelatine.
Asparagus if desired.

Flake the fish and sieve with the anchovy and hard-boiled egg. Dissolve the gelatine in the fish stock. Season with salt, pepper, cayenne, and lemon. Add the milk or cream. Pour into a small soufflé case and leave to set. Serve in the case, or turn out and garnish with green salad and aspic. If preferred the mould may be lined with cooked, fresh or tinned asparagus, and the fish poured into this. When turned out, this will make a fish Charlotte Russe.

Sweetbreads or Brains in Casserole.

Sweetbread or brains may be cooked and served in the same way as fish in casserole (p. 250), ½ oz. onion being added if desired and ½ oz. less milk used (3 oz. only). Tripe cut in small pieces may also be used. It must be stewed for 2 hours.

Yorkshire Pudding. (*Family recipe, making six 2-oz. portions, each containing C., 10 g.; P., 4·5 g.; F., 6 g., which can be substituted for 2 oz. potatoes or ⅔ oz. bread.*)

½ pint milk.
2 oz. flour.
2 eggs.
Seasoning.

Weigh the flour and put it with the seasoning into a basin. Break in the eggs, stir, and add part of the milk gradually, stirring to a smooth batter. Beat well for 10 minutes. Add rest of milk. Bake in a greased tin in a hot oven.

PUDDINGS CONTAINING 5 g. C.

Baked Custard. C., 5 g.; P., 7 g.; F., 6 g.

Half an egg.
3½ oz. milk.
½ grain saccharine.

It is usually more convenient to use a whole egg and make two custards.

Beat the egg well, mix with the milk. Sweeten with crushed saccharine. Divide the mixture into halves with a measuring glass. Bake them separately in two small pie-dishes standing in a pan of water. The oven should be cool, and the custards will take about an hour to set.

Boiled Custard. C., 5 g.; P., 6 g.; F., 7 g.

Half an egg.
3½ oz. milk.
½ grain saccharine.

It is easiest to make double quantity, weigh the custard and halve it. For method of cooking see p. 213.

Vanilla Ice Cream. C., 5 g.; P., 6 g.; F., 7 g.

Make as boiled custard and freeze. It is best to use 14 oz. milk and two eggs, so as to fill a small freezer. Weigh as required into 4½ oz. portions.

Floating Island. C., 5 g.; P., 9 g.; F., 10 g.

1 egg.
3½ oz. milk.
½ grain saccharine.
Vanilla.

Separate the white from the yolk of the egg. Heat the milk and pour over the beaten yolk and crushed saccharine. Return to double saucepan and stir until the custard thickens. Flavour with vanilla and pour into a fireproof dish. Whip up the white stiffly and pile in the centre of the custard. If desired, brown quickly in a hot oven and remove immediately. Serve hot or cold.

Honeycomb Mould. C., 5 g.; P., 5 g.; F., 4 g.

3½ oz. milk.
1½ sheets or ¼ oz. gelatine
½ grain saccharine.
Lemon juice.

Dissolve the gelatine in the warm milk. Add saccharine and strain. Squeeze in a little lemon juice, sufficient to make the milk separate, pour into a wet mould and allow to set. Turn out and serve. A beaten egg white may be folded into the mixture when cool if desired.

Milk Jelly. C., 5 g.; P., 5 g.; F., 4 g.

3½ oz. milk.
¾ to 1 sheet or ⅛ oz. gelatine
½ grain saccharine.
Flavouring.

Bring the milk to the boil. Sweeten with half a saccharine tablet crushed up. When off the fire add the gelatine. Stir till this is dissolved, strain, and leave to set in a cup or mould. Turn out after placing mould in hot water for a moment or two. This jelly may be flavoured by cooking orange or lemon rind in the milk; or with vanilla, almond essence, or strong coffee added after straining.

Junket. C., 5 g.; P., 3·3 g.; F., 4 g.

3½ oz. milk.
½ teaspoonful rennet.
Saccharine.
Flavouring.

Warm the milk to blood temperature. Sweeten with saccharine. Flavour with vanilla or other essence to taste and place in a glass dish. Stir in the rennet and leave to stand in a warm place till set.

Orange Jelly. C., 5 g.; P., 2 g.; F., 0 g.

2 oz. strained orange juice.
1 to 1½ sheets or ¼ oz. gelatine.
Lemon rind.
½ grain saccharine.

Boil 4 oz. water with a piece of lemon rind until the volume is reduced to 2 oz. Remove the rind, add half a saccharine tablet and dissolve the gelatine in the liquid. Add the orange juice. Leave to

set in a mould. Turn out and serve. Lemon juice may be added to the orange juice if desired, more saccharine being used if necessary. One and a half to two sheets of gelatine will be required to set this jelly.

Fruit Jelly. C., 5 g.; P., 2 g.; F., 0 g.

Juice of 1 lemon.
Portion of raw fruit containing 5 g. C.
1½ sheets or ¼ oz. gelatine.
Lemon rind.

Boil ¼ pint water with lemon rind to flavour. Remove the rind, add the juice of a lemon and saccharine to taste. Dissolve one and a half sheets gelatine in the liquid. Slice 1 oz. banana and grapes or other fruit containing 5 g. C. into a mould, and pour the jelly on to them when nearly cold. Turn out and serve.

Fruit Whip. C., 5 g.; P., 3 g.; F., 0 g.

Portion of raw or unsweetened stewed fruit containing 5 g. C. (without juice).
Lemon juice.
Saccharine
White of one egg.

Sieve the fruit and weigh out an amount containing 5 g. C. Sweeten with saccharine and add lemon juice if desired. Just before serving fold in the stiffly beaten white of an egg. Fresh strawberries (2¾ oz.) or raspberries (3 oz.) may be crushed and mixed with egg white as above. Saccharine should not be used with strawberries as the combination produces a very unpleasant taste.

Orange Salad. C., 5 g. (to serve with roast duck).

Slice orange crosswise. Weigh 2 oz. Serve on lettuce and decorate with a few unsweetened cooked cranberries if desired. A little lemon or vinegar and saccharine may be poured over. If fat is not limited a little oil may be mixed with the vinegar.

PUDDINGS CONTAINING 15 g. C.

Apple Charlotte. C., 15 g.; P., 1·4 g.; F., 0·2 g.

⅔ oz. bread-crumbs.
4 oz. stewed apple.

Grease a small pie-dish. Line it with half the crumbs. Fill with stewed apple, cover with crumbs, and bake for about 10 minutes in a hot oven. A little butter may be put over the top if allowed in the diet.

Baked Apple. C., 15 g.; P., 0·6 g.; F., 0 g.

Choose an apple weighing 6 oz. Remove core, insert a clove, and slit the skin right round the apple. Stand in a tin in a little water and bake till tender.

Banana Jelly. C., 15 g.; P., 2·6 g.; F., 0 g.

3 oz. lemon jelly.
3 oz. banana.

Make lemon jelly as for fruit jelly (see above), using 3 oz. liquid only. Sieve 3 oz. banana, mix with the jelly, colour carefully with cochineal. Set in a mould and turn out to serve.

Fruit Jelly. C., 15 g.; P., 3 g.; F., 0 g.

3 oz. lemon jelly.
1 oz. grapes.
1 oz. banana.
2 oz. orange.

Make lemon jelly as for fruit jelly (p. 253). Peel and stone grapes, slice banana, and cut up orange or 2¼ oz. fresh peach or other fruit to make a total containing 15 g. C. Put these in a mould or glass dish. Pour a little of the jelly over them and the rest when this has set. Turn out if desired. A few cooked cranberries sweetened with saccharine may be used to decorate the jelly.

Fruit Salad. C., 15 g.; P., 1 g.; F., 0 g.

The above fruit mixture may be served as fruit salad, a little lemon juice and saccharine being added if desired.

Queen of Puddings. C., 15 g.; P., 10·5 g.; F., 10 g.

3½ oz. milk.
⅔ oz. bread-crumbs.
1 egg.
½ grain saccharine.
Sugarless marmalade if desired.

Beat the yolk of egg with the milk and pour over the bread-crumbs and allow to stand 15 minutes. Grated orange or lemon rind may be mixed with the crumbs if desired. Add saccharine and bake in a moderate oven till set. Spread with sugarless marmalade if available, and pile the stiffly beaten egg white on the top. Brown in the oven and serve hot or cold.

Rice or Tapioca Pudding. C., 15 g.; P., 5·0 g.; F., 5·5 g.

⅓ oz. rice, tapioca or similar cereal.
¼ pint milk.
½ grain saccharine.
Nutmeg if desired.

Weigh and wash the rice or tapioca. Add the crushed saccharine and the milk and bake in a moderate oven, stirring in the first two skins.

Creamed Rice or Tapioca. C., 15 g.; P., 5·0 g.; F., 5·5 g.

⅓ oz. rice, tapioca or similar cereal.
¼ pint milk.
½ grain saccharine.
Nutmeg if desired.

Bring the milk to the boil in a double saucepan. Add the cereal and cook till tender. Serve hot or cold. Lemon rind cooked with the rice, or vanilla essence added when cool will improve the flavour.

Bread-and-Butter Pudding. C., 15 g.; P., 7·5 g.; F., 7·5 g.

⅔ oz. bread.
3½ oz. milk.
Half an egg.
½ grain saccharine.

Beat up the milk with the egg. Add saccharine. Weigh out the bread. Butter it if fat is not strictly restricted. Cut in squares and place in a small pie-dish. Pour custard over them. Allow to stand for about quarter of an hour. Place in a pan of water and bake in a slow oven until firm.

MISCELLANEOUS

Sugarless Marmalade. (*From "The Diabetic Life," R. D. Lawrence.*)

1½ lemons.
Peel of 1 large orange.
5 grains saccharine.
7 oz. water.
¼ oz. gelatine.

Wash the fruit, finely shave the skin, avoiding pith, and chop. Add the juice and pulp of the lemons. Put into a saucepan and cover with the water. Bring to boiling-point and simmer for 2 hours, adding more water if necessary. Cut the gelatine into fine strips and add it with the saccharine to the mixture. Stir for 10 minutes. Put into a jar and leave to set.

This marmalade is of negligible food value if taken in moderation. It will only keep for a few days.

Bran Biscuits.

2½ cupfuls of starch-free dried bran.
2 heaped tablespoonfuls India gum.
2 tablespoonfuls liquid paraffin.
2 grains saccharine.
½ teaspoonful salt.
Boiling water or hot coffee.

Mix the dry ingredients thoroughly. Add the oil and sufficient hot water or coffee to make a mixture that will mould easily. Grease flat tins with liquid paraffin and spread with the mixture ¼ inch deep. Mark into squares and bake in a slow oven till dry.

Note on the preparation of starch-free bran.

Tie about ½ lb. bran from the corn-chandler's in butter muslin so that it is packed very loosely. Put into a saucepan in a large volume of water and bring to the boil. Cool in cold water, then squeeze out as much water as possible. Boil 2 or 3 more times in fresh water until a sample of the bran shows no blue colour when a few drops of iodine are added. It is then free from starch.

RESTRICTED PROTEIN RECIPES EQUIVALENT TO ONE EGG (6 TO 7 G. PROTEIN)

Individual Servings

Fish and Potato Cake.

Flake 1½ oz. fish, mix well with about 2 oz. mashed cooked potatoes and ½ oz. melted butter or margarine. Form into a cake, coat with breadcrumbs or flour and water mixed to a coating consistency. Fry in shallow fat.

Roes on Toast.

1 oz. herring roe. Fry and serve on 2 oz. bread, toasted and buttered.

Salmon Salad.

Flake 1 oz. of salmon (fresh or tinned) and mix with salad dressing (see below). Serve on lettuce leaves. Decorate with cucumber and tomato to taste.

Kedgeree.

Mix 1½ oz. flaked fish with two tablespoonfuls of cooked rice and sauce made from ½ oz. melted butter or margarine, ½ oz. flour, and fish stock or water. Heat gently, stirring all the time. Season to taste, and serve very hot.

Fish Salad.

Mix 1½ oz. flaked fish with one tablespoonful of cooked rice, chopped celery, tomatoes, or capers and salad dressing (see below). Turn into small basin and place a saucer with a weight on top of it. Leave at least an hour, then turn out on to a bed of lettuce or other salad.

Salad Dressing with Negligible Protein Content.

Mix half a tablespoonful of cornflour with a little water. Add sugar, pepper, mustard, and salt (if allowed) to taste. Boil with ¼ pint of water, add ½ oz. margarine or butter, or one teaspoonful of salad oil, and vinegar to flavour. Use when cold.

Minced Chicken or Rabbit on Toast.

Mince 1 oz. chicken or rabbit, moisten with gravy and serve on hot buttered toast.

Baked Egg and Tomato.

Butter a small fireproof dish. Cover the bottom with sliced tomato, and bake for five minutes. Break an egg carefully on to the tomato and bake. Cream may be poured on the egg a few minutes before serving if desired.

Scotch Egg.

Cover a hard-boiled egg with cooked potato, mashed and seasoned. Coat with bread-crumbs and fry a golden brown in deep fat.

Scrambled Egg or Cheese and Tomatoes.

Melt ½ oz. butter or margarine in a saucepan. Slice a large tomato and cook with the butter for a few minutes. Add a well-beaten egg and stir until cooked. 1 oz. grated cheese may be used instead of the egg.

Risotto with Chicken or Rabbit.

Melt ½ oz. butter or margarine in a small saucepan. Put into this one tablespoonful of raw rice and a little onion and fry a golden brown. Add about ½ pint of water, vegetable stock, or yeast extract, and cook gently until the rice is soft, adding water if necessary. A large tomato or some slices of green pepper may be added when the rice is nearly cooked if desired. Cut 1 oz. of cooked chicken or rabbit in dice and mix with the rice, season with salt (if allowed) and pepper, and serve very hot.

Risotto with Cheese.

Cook rice as in preceding recipe, adding the tomato. Grate 1 oz. of cheese, preferably Parmesan, cook with the risotto a few minutes before serving, or serve the risotto plain, sprinkling the grated cheese over it at the last minute.

Macaroni Cheese with Tomatoes.

Cook about six sticks of macaroni (or eight or nine of spaghetti) in boiling salted water. Make tomato sauce by cooking two tomatoes with a little onion in ¼ pint water. Sieve them and thicken the resulting pulp with cornflour or fat and flour. Tomato purée may be used instead. Mix the macaroni with the tomato sauce, and place in a fireproof dish. Grate 1 oz. cheese on to this and brown in a hot oven or under the grill. Serve immediately. If preferred the grated cheese can be mixed and cooked with the macaroni and tomato for a few minutes, or sprinkled over it just before serving.

Scalloped Tomatoes with Cheese.

Grease a small fireproof dish and fill it with alternate layers of breadcrumbs and tomatoes. Put small pieces of butter or margarine on top, and bake in a quick oven. Grate 1 oz. cheese over the tomatoes and brown just before serving.

Cream Cheese and Tomato Savoury (containing 3 g. protein. Approx. ½ portion).

Mix 3 oz. cream cheese with sufficient tomato juice to flavour. Mould into a ball. Serve on lettuce leaves or with biscuits.

PUDDINGS WITH NEGLIGIBLE PROTEIN CONTENT

Butterscotch Sago.

2 oz. sugar.
1 oz. butter or margarine.
Lemon juice.
$\frac{1}{3}$ oz. sago.
$\frac{1}{4}$ pint water.

Melt together butter or margarine and sugar in a double saucepan. Add water and sago when the mixture is hot. Cook till soft, stirring occasionally. Add lemon juice to taste when cool.

Semolina Whip, p. 247.

Fruit Mould, p. 247.

Fruit Sago, p. 247.

LOW PURINE RECIPES

Creamed Egg.

1 egg.
2 oz. thick white sauce.
Cheese if desired.
Salt and pepper.

Boil the egg hard, chop or slice it. Heat the white sauce. Add grated cheese to taste if desired. Stir in the hard boiled egg, season to taste, and serve on hot buttered toast.

Welsh Rarebit.

¼ pint thick white sauce.
2 oz. grated cheese.
2 slices toast.
Butter.
Salt and pepper.

Melt the grated cheese in the white sauce. Season to taste. Serve very hot on buttered toast.

Cheese Balls.

6 large potatoes.
1 egg.
1 oz. margarine.
Blocks of cheese spread with a little mustard.
Egg and bread-crumbs.
Seasoning.

Boil or steam the potatoes and pass through a sieve into a basin with the margarine. Add egg and seasoning and mix. Wrap thickly round the cheese, coat with egg and bread-crumbs, fry in deep fat, drain, garnish, and serve hot.

The following low protein recipes (p. 257) are suitable for use with low purine diets. Cheese and eggs may be used freely, and not restricted as in the low protein recipes.

Scotch Egg.

Cream Cheese and Tomato Savoury.

Risotto with Cheese.

Macaroni Cheese with Tomatoes.

Scalloped Tomatoes with Cheese.

All puddings, except those made with coffee, are suitable for low purine diets.

RECIPES FOR LOW SALT DIETS

Synthetic Milk with Low Sodium Chloride Content.

Stock Solution A.

Potassium hydroxide, 5·6 per cent.

Stock Solution B.

Potassium dihydrogen phosphate KH_2PO_4	6·1 g.	made up to 1,000 c.c.
Calcium lactate	12·4 g.	
Magnesium sulphate $MgSO_4,7H_2O$ ..	4·0 g.	
Ferrous sulphate $FeSO_4,7H_2O$	0·2 g.	

Ashless casein (Glaxo laboratories).
Lactose.
Cream (50 per cent.).

To prepare half a litre of milk (18 oz.) take 20 g. of ashless casein, add 430 c.c. of water and 13 c.c. of potassium hydroxide (stock solution A). Heat to boiling point with constant stirring. Add 50 c.c. of stock solution B and boil again. Allow to cool, add 25 g. of lactose and 2 oz. (56 g.) of cream and stir vigorously.

If the prescribed conditions are adhered to closely a smooth and homogeneous preparation will be obtained. An aluminium saucepan should not be used in the preparation of the milk.

Synthetic Milk with Low Sodium Chloride Content (Alternative Method).

Stock Solution.

Potassium dihydrogen phosphate KH_2PO_4	6·1 g.	made up to 1,000 c.c. with water
Magnesium sulphate $MgSO_4$, $7H_2O$ ..	4·0 g.	
Ferrous sulphate $FeSO_4$, $7H_2O$	0·2 g.	

Calcium caseinate (Glaxo laboratories).
Lactose.
Cream (50 per cent.).

To prepare half a litre of milk take 20 g. of calcium caseinate, mix with 443 c.c. warm water, using an egg whisk. Add 50 c.c. of stock solution and boil. Allow to cool. Add 25 g. of lactose and 56 g. of cream.

Preparation of Low-Salt Butter or Margarine.

Place the butter or margarine in a large saucepan half filled with water and bring to the boil. Remove the pan from the fire and stand it in a cool place until the fat resolidifies. Pour the water away and repeat the process twice.

Cream Cheese.

If fresh cream is used it should be left to stand in a warm place for two days to ripen. Then hang it in a muslin bag

for several days, scraping the moisture from the outside of the bag occasionally. After two days it is advisable to cut the cheese in half and reverse the halves in the muslin in order to squeeze out as much buttermilk as possible.

Low-Salt Casein Bread.

22½ oz. flour.
5½ oz. ashless casein or calcium caseinate.
½ oz. yeast.
¾ pint water.

Mix the casein and flour in a warm basin. Mix the yeast with the water (lukewarm) and pour into a well made in the flour and casein mixture. Sprinkle a little of the flour over the top of the liquid, cover basin and leave to stand in a warm place for 25 minutes. Mix and knead well on a warm board. Put back into basin, cover with cloth, and leave in a warm place for two hours. Divide the dough into loaves, put into tins previously greased, floured, and warmed. Leave in a warm place for 45 minutes. Then bake in a hot oven for about 25 to 30 minutes.

Note.—Bread may be made in the usual way without the addition of salt if extra protein is not required.

Mince and Tomato Pie.

6 oz. minced raw mutton, steak or veal.
1 oz. chopped onions.
4 oz. tomatoes.
1 oz. low-salt butter.
Pepper to taste.
½ tablespoon bread-crumbs (low-salt).

Wash the meat very thoroughly in a fine sieve in running cold water. Then boil, changing the water twice, and drain. Fry the onion in ½ oz. of butter (low-salt). Butter a deep fireproof glass dish and put into it a layer of tomato, a sprinkling of onion, and a layer of meat. Continue until all is used up. Bake for one hour. Then sprinkle with bread-crumbs, add the remains of the butter, and bake till brown.

Stuffed Vegetable Marrow.

4 oz. raw minced mutton, steak, or veal.
2 oz. vegetable marrow.
1 oz. grated onion.
½ oz. boiled rice (no added salt).
¾ oz. bread-crumbs (low-salt).
¾ oz. butter (low-salt).

Prepare the meat as described under "Mince and Tomato Pie." Cut both ends of the marrow, remove the seeds, and scoop out ready for stuffing. Boil the rice and drain well. Mix meat, rice, and grated onion. Add pepper, and stuff the marrow with the mixture. Sprinkle with bread-crumbs and dabs of butter and bake for half an hour.

Mince and Chestnut Rissoles.

4 oz. raw minced meat.
1 oz. sieved chestnuts or chestnut flour.
8 oz. vegetable marrow.
½ oz. flour.
½ oz. low-salt milk.
½ oz. bread-crumbs (low-salt).

Prepare mince as described under "Mince and Tomato Pie." Boil, peel, and sieve the chestnuts. Make mince and chestnuts into rissoles with the bread-crumbs and fry in butter. Peel marrow, remove seeds, cut into half rounds and parboil. Dip in batter made with milk and flour and fry in salt-free butter. Serve round the rissoles.

Chutney.

1 pint white wine vinegar.
1½ lb. cooking apples.
1 lb. onions.
¼ lb. seedless raisins.
1 lb. Demerara sugar.
½ teaspoon pepper.
½ teaspoon mustard.
½ teaspoon ground ginger.
1 teaspoon allspice.

Peel and cut up apples and boil in the vinegar till soft. Then add sugar, onions (cut into small pieces), raisins, and spices, and boil for a further half-hour with frequent stirring. Pour into jars and tie down when cold.

Curry Powder.

2 drachms turmeric.
4 chillies.
2 grains mustard seed.
2 drachms coriander seed.
2 grains cumin.
2 drachms poppy seed.

Pound in a mortar. Use as ordinary curry powder with washed minced meat, prepared as for mince and tomato pie (p. 261). Serve with boiled rice.

Shortbread.

4 oz. flour.
2 oz. ground rice.
4 oz. low-salt butter.
2 oz. castor sugar.

Mix flour and sugar on a board, and work this into the butter. (Add no liquid.) Roll out till about ¾ inch thick, mark with a knife, and place in very lightly greased tin. Prick all over with a fork. Bake in moderate oven 40 to 50 minutes.

Toffee.

½ lb. granulated sugar.
1 oz. low-salt butter.
1 teaspoonful white wine vinegar.
2 tablespoonsful golden syrup.

Place all the ingredients in a saucepan with a tablespoonful of water. Heat gently and stir occasionally till the contents are melted. Boil rapidly for 10 minutes, or until a small portion, dropped into cold water, becomes brittle. Pour into buttered tins or dishes and mark into squares while still warm.

Fondant (also suitable for low calcium diet).

12 to 14 oz. sugar.
5 oz. hot water (distilled for low Ca diet).
Peppermint or lemon essence.

Dissolve the sugar in the water and boil until a small portion, dropped into cold water, forms a soft ball. Cool, add flavouring, and heat until smooth and of the usual fondant consistency. Spread in a tin and cut into shapes.

LOW POTASSIUM RECIPES

Note on Low Potassium Diets.

Foods which contain appreciable amounts of potassium should be cut up finely and cooked in plenty of salted water so that the potassium may dissolve into it and be thrown away. Meat cut finely for stewing will retain its flavour better if it is tied in a square of parchment paper and cooked in plenty of water. The water must be thrown away, but gravy (see below) should be served with the meat.

Salt (NaCl) should be used wherever possible in dishes for patients suffering from Addison's Disease.

Mustard, curry powder, ginger, and meat and yeast extracts contain appreciable amounts of potassium, and should not be used unless their value is reckoned in the diet.

White sugar should always be used in preference to brown.

SOUP AND SAVOURY DISHES

Tripe and Onions. 0·05 g. Potassium.

3 oz. tripe.
1½ oz. onions (boiled).
½ oz. cornflour.
½ oz. margarine.
½ pint water.
Salt to taste.

Cut the tripe in neat pieces, cut up the onions and place them in a saucepan with water and salt. Stew for about two hours until tender. Melt the margarine, stir in the cornflour to make a smooth paste, add liquor from the tripe, stir and cook for a few minutes, pour this over the tripe and stew for another 5 minutes.

Onion Soup. 0·05 g. Potassium.

2 oz. onions.
½ oz. cornflour.
½ oz. margarine.
½ pint water.
Salt to taste.

Slice the onions and fry them lightly in the margarine. Add the cornflour, stirring well, and then the water and salt. Cook gently for about half an hour until the onions are tender.

Low Potassium Gravy. Negligible Potassium Content.

½ oz. cornflour.
½ oz. margarine or clarified fat.
½ pint water.
Browning.
Salt.
Pepper if desired.

Melt the fat, mix in the cornflour to a smooth paste, add the water, stirring all the time. Cook a few minutes, then add seasoning and browning.

Cream Cheese Salad. 0·05 g. Potassium.

1½ oz. cream cheese.
Salt and pepper.
½ oz. lettuce.

Season the cream cheese with salt and pepper. Form into balls and serve on the lettuce.

Cream Cheese and Onion or Olive Salad. 0·05 g. Potassium.

1½ oz. cream cheese.
¼ oz. raw onion or ⅓ oz. olives (without stones).
⅓ oz. lettuce.
Salt and pepper.

Chop the onion or olive finely, mix with the cream cheese, and season with salt and pepper. Form into balls and serve on the lettuce or with ½ oz. unsweetened biscuits.

PUDDINGS

Custard. 0·025 g. Potassium.

½ oz. custard powder.
⅔ oz. cream.
7 oz. water.
Sugar to taste.

Mix the custard powder with a little of the water to a smooth paste. Bring the remainder to the boil. Add this to the custard powder, and sugar to taste. Stir and cook a few minutes until the mixture has thickened and tastes cooked. Add the cream when cool. Stir well and serve.

Creamed Rice. 0·05 g. Potassium.

¾ oz. rice.
1 oz. cream.
Sugar.
Water.

Wash the rice and cook it in about 7 oz. water with sugar in a double saucepan or in the oven. When no longer boiling stir in the cream. Vanilla or almond essence may also be added if desired. This pudding can be served hot or cold.

Rice and Pear. 0·05 g. Potassium.

1 oz. raw pear
or
1¼ oz. stewed pear.
⅓ oz. rice.
⅘ oz. cream.
Sugar to taste.
Glacé cherry.

Cook the rice in sugar and water. Stir in the cream when cool, and place in a small dish. Slice the pear and place it on the rice. Decorate with a glacé cherry.

The pear can be coated with caramel (see recipe, p. 266) if desired.

Pear Caramel. 0·05 g. Potassium.

2½ oz. stewed pear.
Sugar for caramel.

Coat the pear with caramel (see recipe, p. 266).

Caramel. Contains no Potassium.

Put sugar in a strong saucepan or frying-pan and allow it to liquefy over a medium heat, stirring all the time. Remove immediately it becomes light brown, and pour over the fruit to be coated, or add water and continue boiling for a few minutes. The liquid caramel may be turned into sauce by thickening it with 1 oz. cornflour to a pint of caramel.

Some cooks prefer to cook the sugar with water and to stir the mixture only after this has evaporated.

Apple Tapioca. 0·05 g. Potassium.

1½ oz. apple.
¼ oz. lemon juice.
Sugar and lemon rind to taste.
½ pint water.
½ oz. tapioca or sago.

Cut the apple in slices. Stew in water with the tapioca or sago, sugar, and lemon rind until the tapioca is clear. Add the lemon juice and serve cold. Decorate with a glacé cherry if desired.

The apple may be omitted and ⅓ oz. lemon juice used instead of ¼ oz. to make lemon tapioca.

Gooseberry Fool. 0·05 g. Potassium.

1 oz. sieved and sweetened stewed gooseberries.
½ oz. cornflour.
½ oz. cream.
7 oz. water.

Mix the cornflour to a smooth paste with a little water. Heat the rest, add the cornflour and stir a few minutes until cooked. Cool, stir in the sieved gooseberries, add the cream, and more sugar if necessary. Serve very cold.

Plain Jelly. 0·015 g. Potassium.

7 oz. plain jelly, prepared in the ordinary way from packet jelly, contains approximately 0·015 g. Potassium.

Rice and Jelly. 0·025 g. Potassium.

¼ oz. rice.
½ oz. cream.
2 oz. jelly.
Sugar.

Cook the rice with a little sugar in water. Drain it and mix it with the cream. Place in a wetted mould. Pour over 2 oz. of made jelly (preferably not made from fresh fruit). Stir and allow to set. Turn out and serve.

Butterscotch Mould with Biscuits. 0·035 g. Potassium.

½ oz. cornflour.
¼ oz. margarine.
1 oz. sugar.
⅓ oz. lemon juice.
¼ pint water.
¼ oz. sweet biscuits.

Melt the margarine and the sugar together. Blend the cornflour with a little of the water, bring the rest to the boil with the margarine and sugar. Add the cornflour and cook for a few minutes after the mixture has thickened. Add the lemon juice when cooling. Mould and serve with ¼ oz. sweet biscuits.

Strawberry Whip. 0·005 g. Potassium.

1½ oz. packet jelly (strawberry flavour).
¼ pint water.

Dissolve the jelly in boiling water, and when cold, but still liquid, whip until frothy. Serve in a glass dish and decorate with a glacé cherry if desired.

Snow Cake. 1 oz. contains 0·019 g. Potassium.

4 oz. cornflour.
2 oz. margarine.
2 oz. sugar.
2 egg whites.
⅓ teaspoon baking powder.
⅓ teaspoon vanilla, almond or lemon essence.

Sift the cornflour, and cream the fat and sugar very thoroughly. Beat the egg whites until stiff and add them to the creamed mixture, alternately with the cornflour. Beat very well, add the flavouring essence, and lastly the baking powder. Turn into a tin, previously lined with greased paper. Bake 40 to 45 minutes in a moderate oven.

Jellied Apples. 0·05 g. Potassium.

3 oz. stewed apples.
⅕ oz. cornflour.
Sugar to taste.
Lemon rind.
Water.

Peel and core two medium-sized apples. Stew them gently in ¼ pint water, with sugar and lemon rind, keeping them whole. Drain, weigh out 3 oz., and place in a glass dish. Mix the cornflour with a little water to a smooth paste. Boil ¼ pint water with sugar and lemon rind for about 10 minutes. Add the cornflour after removing the lemon rind, boil for a few minutes, colour with cochineal if desired, and pour over the apple.

CHAPTER XIV

TABLES

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TABLE I

THE CHEMICAL COMPOSITION OF FOODS

All figures have been derived from the following sources:

McCance and Shipp, 1933. *The Chemistry of Flesh Foods and their Losses in Cooking.*

McCance, Widdowson, and Shackleton, 1936. *The Nutritive Value of Fruits, Vegetables and Nuts.*

McCance and Widdowson, 1946. *The Chemical Composition of Foods.* Second Edition.

Accessory Food Factors Committee of the Medical Research Council (1945). Nutritive Values of Wartime Foods.

The figures show the composition of 1 oz. (28·4 grams) of the *edible portion*, except where otherwise stated.

Vegetables are cooked *without* added salt or soda. Fruit is stewed *without* sugar. Fried fish is coated with batter and crumbs, flour, or oatmeal before cooking.

Where the food is known to have had salt added during preparation, the figures for sodium and chlorine are given in brackets.

The composition of some cooked dishes, cakes, puddings, etc., is included. These are marked *, and the recipes used in their preparation and the method of cooking are given on pp. 214–230. They are prepared with sugar, salt, or baking powder in the usual way.

The composition of number of " economical " dishes is also given. Most of these were made using recipes advocated by the Ministry of Food, with dried eggs and skimmed milk powder instead of the fresh materials, with less fat and sugar, and with National wheatmeal flour. The baking powder was made from acid calcium phosphate and sodium bicarbonate, and the figures for calcium and phosphorus in these dishes are given in brackets.

The figure for calcium in the cooked dishes does not include any extra calcium added for the fortification of the flour. If the flour is fortified with calcium, the calcium in all the cooked dishes containing flour will be increased by 18 mg. per ounce of flour.

The column headed " Vitamin A Potency " includes vitamin A and carotene. The letter (c) after the figure indicates that the sole source of vitamin A potency is carotene. In calculating the total vitamin A potency of a mixed diet the international units of carotene should be divided by 3 and then added to the value for preformed vitamin A.

Where vitamin determinations have been made on the raw food, but the rest of the analysis applies to the food after cooking, the vitamin values are marked (R).

Tr.=trace (of no quantitative dietetic significance).

— = not estimated. The constituent may or may not be present.

THE CHEMICAL COMPOSITION OF FOODS

No.	Food	Grams per oz.				Milligrams per oz.				
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium	Ir
1	All-Bran, Kellogg's	16·5	3·6	1·3	96	(345)	271	23·4	119·3	3
2	Apples, eating, raw (weighed with skin and core)	2·6	0·1	Tr.	11	0·5	26	0·8	1·0	0
3	Apples, cooking, baked	2·8	0·1	Tr.	11	0·6	36	1·0	0·9	0
4	Apples, cooking, stewed	1·2	Tr.	Tr.	5	0·3	16	0·5	0·4	0
5	Apple Charlotte*	7·9	0·4	4·5	74	(21)	28	2·1	1·6	0
6	Apple dumpling*	8·0	0·6	2·7	58	(12)	31	1·9	1·9	0
7	Apple pudding*	9·0	0·7	3·6	71	(14)	21	1·8	2·0	0
8	Apple tart*	9·3	0·6	2·5	61	(20)	26	1·7	1·8	0
9	Apricots, fresh, raw (weighed with stones)	1·7	0·2	Tr.	7	Tr.	84	4·5	3·2	0
10	Apricots, dried, raw	12·3	1·4	Tr.	52	16·0	535	26·3	18·6	1
11	Apricots, dried, stewed	5·1	0·6	Tr.	21	6·7	223	10·9	7·7	C
12	Apricots, tinned in syrup	4·5	0·1	Tr.	17	0·3	73	3·4	2·0	C
13	Arrowroot	25·7	0·1	Tr.	101	1·4	5	2·0	2·2	C
14	Artichokes, Jerusalem, boiled	0·9	0·5	Tr.	5	0·7	119	8·6	3·2	C
15	Asparagus, boiled (weighed as served)	0·2	0·5	Tr.	3	0·3	34	3·7	1·5	C
16	Bacon, raw	0·0	4·0	10·6	115	(348)	71	3·8	4·1	C
17	Bacon, fried	0·0	6·9	14·2	159	(837)	139	9·1	7·2	C
18	Bananas	5·5	0·3	Tr.	22	0·3	99	1·9	11·9	C
19	Banana custard*	5·1	0·7	0·7	29	8·8	64	23·9	6·7	C
20	Barley, Pearl	23·1	2·2	0·5	102	0·7	35	2·8	5·7	C
21	Beans, baked, tinned.	4·9	1·7	0·1	26	(168)	98	17·4	10·4	C
22	Beans, Broad, boiled	2·0	1·2	Tr.	12	5·6	66	6·0	7·8	C
23	Beans, Butter or Haricot, boiled	4·8	2·0	Tr.	26	4·4	102	11·8	11·1	
24	Beans, French or Runner, boiled	0·3	0·2	Tr.	2	1·0	27	9·2	3·3	
25	Beef, Corned	0·0	6·3	4·3	66	(392)	33	3·6	8·2	
26	Beefsteak, raw	0·0	5·5	3·0	50	19·6	95	1·5	6·9	
27	Beefsteak, grilled	0·0	7·2	6·1	86	19·0	105	2·6	7·2	
28	Beefsteak pudding*	6·1	2·9	3·7	69	(223)	47	2·1	4·4	

Milligrams per oz.			Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
Phosphorus	Sulphur	Chlorine	$\frac{N}{10}$ Acid	$\frac{N}{10}$ Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Riboflavin	Ascorbic Acid (Vitamin C)	No.
231·5	51·6	(574)	12		0	—	—	0	1
1·7	1·3	0·3		6	9 (C)	10	—	1	2
4·8	0·9	1·4		7	—	—	—	—	3
2·1	0·4	0·6		3	—	—	—	—	4
6·4	3·6	(31)		4	—	—	—	—	5
9·3	7·3	(20)	1		—	—	—	—	6
8·8	8·6	5·8		1	—	—	—	—	7
8·3	6·8	(33)	1		—	—	—	—	8
5·6	1·6	Tr.		22	196 (C)	8	—	3	9
33·5	46·6	9·8		119	1420 (C)	0	—	0	10
13·9	19·4	4·1		49	—	—	—	—	11
3·7	0·3	0·4		20	142 (C)	6	—	1	12
7·8	0·5	2·0	1		—	—	—	—	13
9·4	6·1	16·4		23	—	—	—	—	14
12·0	6·6	4·5	1		198 (CR)	51 (R)	—	17 (R)	15
34·6	46·0	(530)	21		0	170	—	0	16
66·4	85·0	(1265)	43		0	—	—	0	17
8·0	3·7	22·3		23	23 (C)	14	—	3	18
21·3	6·9	26·3		12	—	—	—	—	19
58·3	30·5	29·7	50		0	34	—	0	20
52·1	14·4	(230)		8	142 (C)	17	—	0	21
28·1	7·7	4·0		5	—	—	—	9 (R)	22
29·5	13·3	0·5		16	0	128 (R)	—	0	23
3·7	2·6	2·8		10	170 (CR)	21 (R)	—	4 (R)	24
33·8	60·0	(590)	39		0	0	—	0	25
78·2	57·0	19·9	52		14	23	71	0	26
86·0	76·0	18·2	66		14 (R)	23 (R)	71 (R)	0	27
37·3	30·3	(318)	19		—	—	—	—	28

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

No.	Food	Grams per oz.				Milligrams per oz.				
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium	I
29	Beef, topside or sirloin, roast. Lean only	0·0	7·6	3·9	67	20·7	103	1·8	7·5	1
30	Beef, salt, boiled	0·0	7·9	5·7	86	(417)	82	6·6	5·7	1
31	Beef, stewed	0·0	8·7	2·4	58	10·8	43	0·9	6·0	1
32	Beer or ale (per pint)†	18·2	1·8	Tr.	286	98·0	286	69·0	54·2	0
33	Beetroot, boiled	2·8	0·5	Tr.	13	18·2	99	8·5	4·8	0
34	Biscuits, Cream crackers	16·3	2·4	9·4	158	(124)	36	5·1	5·4	0
35	Biscuits, Digestive	18·7	2·7	5·8	137	(124)	44	12·4	9·1	0
36	Biscuits, Oatmeal (economical)*	20·8	2·7	3·5	139	(34)	70	(20)	20·6	C
37	Biscuits, Plain (economical)*	20·1	2·7	6·0	142	(43)	37	(36)	9·5	C
38	Biscuits, Plain mixed	21·4	2·1	3·8	123	(69)	48	12·9	4·1	C
39	Biscuits, Rusks	20·8	1·7	2·4	116	(59)	40	24·6	7·7	C
40	Biscuits, Sweet mixed	18·9	1·6	8·7	158	(61)	39	7·7	4·0	C
41	Biscuits, Water	20·7	3·0	3·5	126	(134)	40	6·3	5·4	C
42	Blackberries, raw	1·8	0·4	Tr.	8	1·1	59	18·0	8·4	C
43	Blackberries, stewed	0·9	0·2	Tr.	4	0·5	30	9·1	4·2	C
44	Blackcurrants, raw	1·9	0·3	Tr.	8	0·8	106	17·2	4·9	"
45	Blackcurrants, stewed	1·3	0·2	Tr.	6	0·5	74	12·0	3·4	"
46	Black treacle	19·1	0·3	0·0	73	27·2	416	140·5	40·9	
47	Blancmange*	5·2	0·9	1·1	34	12·8	44	33·1	3·8	
48	Bloater, grilled (weighed with bones)	0·0	4·7	3·7	54	(148)	94	25·9	9·4	
49	Bournvita	19·2	3·2	2·1	105	102·0	188	25·3	48·2	
50	Bovril	0·0	8·3	0·2	36	(1580)	1020	14·8	48·0	
51	Bread, Currant	13·0	1·8	1·0	71	(47)	71	10·7	7·0	
52	Bread, Hovis	11·5	3·0	1·1	71	(129)	69	7·8	22·4	
53	Bread, Malt	14·0	2·4	0·9	71	(78)	108	15·0	22·0	
54	Bread, Brown (90%)	15·2	2·4	0·4	70	(112)	42	4·9	14·9	
55	Bread, National Wheatmeal (85%)	15·8	2·4	0·3	72	(112)	33	4·3‡	10·6	
56	Bread, 80%	16·3	2·4	0·3	74	(112)	27	3·8‡	7·6	

† Contains 29·7 c.c. alcohol per pint.

Milligrams per oz.				Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
p-r	Phosphorus	Sulphur	Chlorine	N/10 Acid	N/10 Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Riboflavin	Ascorbic Acid (Vitamin C)	No.
06	81·0	80·0	19·3	64		14 (R)	23 (R)	71 (R)	0	29
95	69·0	83·0	(660)	71		14 (R)	23 (R)	71 (R)	0	30
–	65·0	93·0	11·0	82		14 (R)	23 (R)	71 (R)	0	31
48	101·0	130·0	195·0	6		0	22	—	0	32
94	10·1	6·3	21·5		25	0	10 (R)	—	3 (R)	33
94	23·2	22·1	(200)	15		—	—	—	—	34
97	38·0	20·5	(123)		7	—	—	—	—	35
98	71·3	—	(61)	—	—	—	—	—	—	36
97	(76)	—	(46)	—	—	—	—	—	—	37
92	11·6	23·7	(74)		9	—	—	—	—	38
06	22·8	30·5	(49)		7	—	—	—	—	39
03	18·8	9·1	(105)	4		0	18	—	0	40
14	24·6	28·4	(192)	11		0	37	—	0	41
13	6·8	2·6	6·3		24	85 (C)	6	—	6	42
02	3·4	1·3	3·2		12	—	—	—	—	43
14	12·3	9·4	4·2		25	25 (C)	13	—	57	44
13	8·6	6·6	2·9		17	—	—	—	—	45
12	8·7	19·5	231·0		140	0	—	—	0	46
01	26·8	8·0	27·5		7	—	—	—	—	47
	74·6	65·0	(238)	156		33 (R)	2 (R)	—	0	48
18	117·0	69·0	52·5		13	—	—	—	—	
14	369·0	103·0	(1950)		145	—	—	—	—	49
03	34·4	16·9	(81)	6		—	—	—	—	50
03	73·0	22·0	(182)	16		—	—	—	—	51
02	71·9	32·6	(149)	21		—	—	—	—	52
09	45·5	—	(172)	—	—	0	—	—	—	53
07	36·1	—	(172)	—	—	0	52	—	0	54
06	27·8	—	(172)	—	—	0	43	—	0	55

‡ If flour is fortified with calcium, add 13 mg. Ca per oz. bread.

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

No.	Food	Grams per oz.				Milligrams per oz.				
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium	I
57	Bread, White (70%)	16·9	2·3	0·2	75	(112)	20	3·2	4·7	C
58	Bread, White, toasted	20·0	2·7	0·3	89	(133)	24	3·8	5·5	C
59	Bread, White, fried	14·9	2·0	10·6	163	(99)	18	2·9	4·1	C
60	Bread pudding (economical)*	11·4	1·8	3·2	80	(60)	57	(17)	7·1	C
61	Bread and butter pudding*	4·7	1·6	2·3	46	(32)	56	33·7	4·9	C
62	Bread sauce*	3·6	1·1	1·4	32	(92)	44	29·5	4·4	C
63	Brussels sprouts, boiled	0·5	0·7	Tr.	5	2·2	70	7·7	3·0	C
64	Buck rarebit*	4·6	4·1	8·7	114	(122)	35	94·5	8·0	C
65	Buns, Currant	15·4	2·1	2·2	87	(29)	52	10·2	6·3	C
66	Buns, Rock*	18·2	1·6	4·8	120	(44)	54	13·9	5·3	C
67	Butter, " fresh "	Tr.	0·1	24·2	226	(63)	4	4·2	0·7	C
68	Cabbage, raw	2·4	0·8	Tr.	12	8·1	68	20·6	4·8	C
69	Cabbage, boiled	0·3	0·2	Tr.	2	3·7	36	12·5	2·0	C
70	Cabinet pudding*	5·8	1·3	1·3	39	(30)	56	24·7	4·6	C
71	Cake, Cherry*	15·8	1·3	6·8	129	(39)	20	9·1	2·9	C
72	Cake, Chocolate*	15·4	1·8	6·6	128	(61)	26	6·4	4·0	•
73	Cake, Coconut*	15·3	2·0	6·6	128	(47)	49	9·9	6·5	•
74	Cake, Currant*	17·1	1·7	5·2	120	(43)	59	9·8	5·0	•
75	Cake, Dundee	17·7	1·1	4·3	110	(40)	96	14·3	7·8	•
76	Cake, Orange*	14·9	1·7	7·2	132	(56)	26	5·9	3·3	•
77	Cake Plain (economical)*	15·0	2·0	5·7	117	(44)	31	(34)	6·7	•
78	Cakes, Queen*	16·2	1·7	6·4	129	(46)	49	9·2	4·4	•
79	Cakes, Rock*	18·4	1·7	4·5	119	(43)	68	12·0	5·7	•
80	Cakes, Rock (economical)*	18·4	2·2	3·6	112	(41)	79	(44)	9·7	•
81	Cake, Sponge*	15·2	2·5	2·0	88	22·5	33	9·9	3·9	•
82	Canary pudding*	15·4	1·8	7·0	134	(49)	26	7·5	3·6	•
83	Carrots, raw	1·5	0·2	Tr.	6	27·0	64	13·6	3·4	•
84	Carrots, boiled	1·2	0·2	Tr.	5	14·2	25	10·4	1·8	•
85	Castle pudding, steamed*	13·1	1·5	5·9	110	(41)	21	5·5	2·9	•
86	Cauliflower, boiled	0·3	0·4	Tr.	3	3·2	43	6·5	1·9	•
87	Celery, raw	0·4	0·3	Tr.	3	38·9	79	14·8	2·7	•
88	Celery, boiled	0·2	0·2	Tr.	1	18·9	38	14·8	2·4	•
89	Cheese, Cheddar	Tr.	7·1	9·8	120	(174)	33	230·0	13·3	•
90	Cheese, Cream	Tr.	0·9	24·5	232	(31)	13	8·4	1·5	•
91	Cheese, Dutch	Tr.	8·0	4·8	77	(155)	27	256·0	14·9	•
92	Cheese, Gorgonzola	Tr.	7·1	8·8	112	(347)	49	153·0	10·7	•

Milligrams per oz.			Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
Phosphorus	Sulphur	Chlorine	$\frac{N}{10}$ Acid	$\frac{N}{10}$ Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Riboflavin	Ascorbic Acid (Vitamin C)	No.
19·6	—	(172)	—	—	0	—	—	0	57
23·3	—	(204)	—	—	0	—	—	0	58
17·3	—	(152)	—	—	0	—	—	0	59
(38)	—	(66)	—	—	—	—	—	—	60
35·4	16·4	(54)		1	—	—	—	—	61
26·1	9·6	(145)		6	—	—	—	—	62
12·7	22·0	3·2		2	113 (CR)	34 (R)	—	28 (R)	63
80·7	40·7	(195)	16		—	—	—	—	64
18·4	20·8	(55)	5		—	42	—	—	65
22·2	18·1	(41)		7	—	—	—	—	66
6·8	2·6	(94)	1		1136	0	0	0	67
18·2	20·3	11·2		8	255 (C)	21	—	20	68
6·8	6·0	2·9		10	—	—	—	—	69
27·9	9·9	(44)		7	—	—	—	—	70
20·1	17·9	(36)	5		—	—	—	—	71
29·2	23·8	(51)	8		—	—	—	—	72
28·8	23·5	(48)	3		—	—	—	—	73
24·1	21·8	(42)		9	—	—	—	—	74
22·3	15·6	(51)		17	—	—	—	—	75
24·9	22·3	(54)	8		—	—	—	—	76
(67)	—	(46)	—	—	—	—	—	—	77
26·8	22·6	(37)	1		—	—	—	—	78
23·9	21·0	(38)		8	—	—	—	—	79
(81)	—	(34)	—	—	—	—	—	—	80
41·2	34·9	29·3	30		—	—	—	—	81
26·6	22·9	(40)	8		—	—	—	—	82
6·0	2·0	19·5		26	4250 (C)	17	—	3	83
4·7	1·4	8·8		13	—	—	—	—	84
21·8	19·3	(33)	7		—	—	—	—	85
9·4	8·4	3·3		5	0	28 (R)	—	20 (R)	86
9·0	4·2	52·0		24	0	9	—	1	87
5·5	2·4	28·4		14	—	—	—	—	88
155·0	65·2	(300)	15		369	9	142	0	89
12·5	18·2	(43)	10		—	—	—	—	90
136·0	53·1	(582)		17	—	—	—	—	91
107·0	50·2	(511)	1		—	—	—	—	92

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

No.	Food	Grams per oz.				Milligrams per oz.				
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium	I
93	Cheese, Gruyère	Tr.	10·4	9·5	131	(154)	36	306·0	12·8	
94	Cheese, Packet	Tr.	6·4	8·5	106	(260)	24	206·0	13·5	
95	Cheese, St. Ivel	Tr.	6·6	8·7	108	(161)	19	137·0	6·6	
96	Cheese, Stilton	Tr.	7·1	11·4	135	(326)	46	103·0	7·7	
97	Cheese pudding (economical)*	2·9	2·5	2·1	41	(140)	39	55·3	6·1	
98	Cheese sauce*	2·5	1·9	3·7	52	(155)	45	57·7	5·4	
99	Cheese straws*	7·3	4·7	13·5	172	(234)	32	116·0	8·9	
100	Cherries, raw (weighed with stones)	3·0	0·1	Tr.	11	0·7	68	3·9	2·4	
101	Cherries, stewed (weighed with stones)	1·2	0·1	Tr.	5	0·4	31	2·0	1·2	
102	Chicken, boiled	0·0	7·4	2·9	58	27·8	108	3·0	7·5	
103	Chicken, roast	0·0	8·4	2·1	54	22·7	101	4·1	6·5	
104	Chocolate, milk	14·9	2·1	9·7	154	26·5	138	49·8	16·3	
105	Chocolate, plain	16·6	1·3	9·2	153	5·3	113	7·4	23·2	
106	Chocolate mould*	6·0	0·9	1·1	37	16·4	45	31·9	4·5	
107	Cocoa powder	9·9	5·8	6·6	128	185·0	152	14·6	54·5	
108	Cod, fried	0·8	5·9	1·3	40	45·8	97	14·1	7·6	
109	Cod, steamed	0·0	5·1	0·3	23	28·4	102	4·2	5·9	
110	Coffee, ground	8·1	3·6	4·4	85	20·8	575	37·8	66·8	
111	College pudding*	13·6	1·2	6·8	120	(77)	66	9·4	4·3	
112	Cornflakes, Kellogg's	23·4	1·9	0·2	104	(298)	32	2·1	4·7	
113	Cornflour	26·1	0·1	0·2	100	14·7	17	4·4	2·0	
114	Crab, boiled	0·0	5·4	1·5	36	104·0	77	8·3	13·6	
115	Cream (40%)	0·7	0·5	11·9	115	9·0	26	16·8	1·3	
116	Cucumber	0·5	0·2	Tr.	3	3·7	40	6·5	2·6	
117	Currants, dried, raw	18·0	0·5	Tr.	69	5·5	201	27·1	10·3	
118	Curried meat*	2·5	2·3	3·2	48	(84)	72	9·3	5·8	
119	Custard, egg boiled or baked*	3·3	1·4	1·6	33	17·5	47	34·1	4·1	
120	Custard powder (take as Cornflour)									
121	Custard powder custard*	4·8	0·9	1·1	33	13·1	46	34·7	4·0	
122	Damsons, raw (weighed with stones)	2·4	0·1	Tr.	9	0·6	74	6·0	2·8	
123	Damsons, stewed (weighed with stones)	1·8	0·1	Tr.	7	0·4	56	4·6	2·2	

Milligrams per oz.				Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
Copper	Phosphorus	Sulphur	Chlorine	N/10 Acid	N/10 Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Riboflavin	Ascorbic Acid (Vitamin C)	No.
0·08	198·0	58·5	(235)		10	—	—	—	—	93
0·01	136·0	91·0	(308)		1	—	—	—	—	94
0·01	107·0	52·9	(258)	25		—	—	—	—	95
0·01	86·2	64·5	(488)	22		—	—	—	—	96
0·04	55·0	—	(217)	—	—	—	—	—	—	97
0·01	42·6	17·2	(249)		4	—	—	—	—	98
0·02	93·0	44·9	(376)	20		—	—	—	—	99
0·02	4·2	1·7	Tr.		18	49 (C)	12	—	1	100
0·01	2·1	0·8	Tr.		8	—	—	—	—	101
—	76·8	83·0	17·6	59		0	} 43 (R)	—	0	{ 102
—	77·0	92·0	28·4	72		0		—		{ 103
0·04	61·0	19·0	37·7		24	—	34	—	0	104
0·32	39·5	9·1	2·5		22	21 (C)	26	—	0	105
0·02	28·0	8·2	27·9		7	—	—	—	—	106
0·20	194·0	45·5	56·5		2	43 (C)	34	—	0	107
0·03	74·1	69·0	41·1	44		—	—	—	0	108
0·03	68·5	60·0	34·0	46		—	—	—	0	109
0·23	45·7	31·3	6·7		180	—	—	—	—	110
0·04	21·1	16·4	(52)		20	—	—	—	—	111
0·03	16·5	26·2	(432)	6		—	—	—	—	112
0·04	11·1	0·3	20·2		2	0	—	—	0	113
—	99·4	132·0	162·0	112		—	—	—	0	114
0·04	7·1	9·4	15·3		5	—	—	—	—	115
0·03	6·9	3·1	6·9		9	0	13	—	3	116
0·14	11·4	8·8	4·5		62	14 (C)	0	—	0	117
—	28·7	27·9	(124)	7		—	—	—	—	118
0·01	35·1	15·7	33·2	2		—	—	—	—	119
										120
0·01	27·9	8·4	28·4		7	—	—	—	—	121
0·02	4·2	1·6	Tr.		21	—	13	—	1	122
0·02	3·2	1·2	Tr.		16	—	—	—	—	123

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

No.	Food	Grams per oz.				Milligrams per oz.				
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium	I
124	Dates (weighed with stones)	15·6	0·5	Tr.	61	1·2	185	16·6	14·3	0
125	Doughnuts	13·8	1·7	4·5	101	(17)	32	6·1	4·7	0
126	Dripping	0·0	Tr.	28·1	262	1·4	1	0·2	Tr.	0
127	Dumpling*	6·8	0·9	3·2	59	(139)	13	1·8	2·1	0
128	Eggs (per 1 egg) (1 egg=50 g.)	0·0	5·9	6·2	81	67·5	69	28·0	6·2	1
129	Egg white	0·0	2·6	Tr.	11	54·7	42	1·5	3·0	0
130	Egg yolk	0·0	4·6	8·7	99	14·2	35	37·4	4·2	1
131	Eggs, dried	0·0	12·3	12·3	165	147·0	137	54·0	11·7	2
132	Egg sauce*	2·4	1·4	2·9	41	(133)	45	29·9	4·1	0
133	Figs, green, raw	2·7	0·4	Tr.	12	0·5	76	9·7	5·7	0
134	Figs, dried, raw	15·0	1·0	Tr.	61	24·6	288	80·5	26·2	1
135	Figs, dried, stewed	8·5	0·6	Tr.	35	14·0	164	45·8	14·9	0
136	Fish cakes*	2·8	3·5	4·0	61	(119)	85	5·6	5·2	0
137	Fish cakes (economical)*	4·0	3·0	0·5	32	(100)	97	7·4	6·3	0
138	Fish paste	1·9	4·2	2·7	49	(420)	87	41·5	8·6	1
139	Fish pie*	1·9	2·5	4·3	58	(146)	71	14·6	4·6	0
140	Flour, brown (90%)	21·1	3·3	0·5	98	1·0	58	6·8	20·7	0
141	Flour, National Wheatmeal (85%)	21·6	3·3	0·5	99	1·0	45	5·9‡	14·5	0
142	Flour (80%)	22·1	3·2	0·4	100	0·7	36	5·1‡	10·3	0
143	Flour, White (70%)	22·4	3·1	0·3	100	0·6	26	4·3	6·2	0
144	Force	21·5	2·6	0·5	105	(197)	115	18·8	42·1	3
145	Ginger, Ground	17·0	2·1	0·1	74	10·0	258	28·0	38·0	4
146	Gingerbread*	17·9	1·6	3·7	109	(95)	45	10·1	4·4	0
147	Golden syrup	22·4	0·1	0·0	84	76·6	69	7·5	2·7	0
148	Gooseberries, ripe, raw	2·6	0·2	Tr.	10	0·3	48	5·2	2·4	0
149	Gooseberries, unripe, stewed	0·5	0·2	Tr.	3	0·3	30	4·0	1·0	0
150	Gooseberry tart*	8·8	0·7	2·7	62	(22)	38	5·3	2·5	0
151	Grapes, black or white (weighed with skin and pips)	4·1	0·2	Tr.	16	0·4	71	3·1	1·4	0
152	Grapefruit	1·5	0·2	Tr.	6	0·4	66	4·9	3·0	0
153	Grapenuts	20·2	3·3	0·9	102	(187)	121	13·6	43·4	0
154	Greengages, raw (weighed with stones)	3·2	0·2	Tr.	13	0·4	82	4·5	2·1	0

‡ If flour is fortified with calcium add 18 mg. Ca per oz. flour.

Milligrams per oz.				Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
p-er	Phos-phorus	Sul-phur	Chlo-rine	N/10 Acid	N/10 Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Ribo-flavin	Ascorbic Acid (Vitamin C)	No.
05	15·6	12·4	71·0		30	24 (c)	0	—	0	124
03	15·6	16·0	(25)	5		0	24	—	0	125
–	4·0	3·0	0·6	3		28	0	0	0	126
01	8·9	10·5	(177)		4	—	—	—	—	127
02	109·0	86·5	79·5	81		500	75	200	0	128
01	9·2	51·9	48·4	14		—	—	—	—	129
01	141·0	46·7	40·4	94		—	—	—	—	130
05	227·0	179·0	168·5	170		850	113	368	0	131
01	32·3	15·6	(209)	1		—	—	—	—	132
02	9·1	3·7	5·2		20	—	—	—	—	133
07	26·0	22·9	47·1		102	26 (c)	0	—	0	134
04	14·8	13·0	26·8		58	—	0	—	0	135
04	48·1	41·0	(185)	26		—	—	—	—	136
04	43·8	—	(154)	—	—	—	—	—	—	137
02	60·0	53·0	(677)	29		—	—	—	—	138
02	40·7	30·0	(225)	16		—	—	—	—	139
03	63·5	—	11·6	—	—	0	80	35	0	140
00	49·5	—	12·4	—	—	0	75	31	0	141
03	37·5	—	13·3	—	—	0	53	23	0	142
05	26·1	—	13·3	—	—	0	21	18	0	143
00	96·3	29·6	(318)	11		—	—	—	—	144
03	39·0	41·0	11·0		61	—	—	—	—	145
02	23·0	22·2	(30)		25	—	—	—	—	146
03	5·7	15·3	11·8		41	0	0	—	0	147
04	5·4	3·8	3·0		10	57 (c)	13	—	11	148
00	4·8	2·3	1·0		6	—	—	—	—·	149
00	11·2	9·1	(35)		1	—	—	—	—	150
00	4·9	2·2	Tr.		17	14 (c)	8	—	1	151
00	4·4	1·5	0·4		18	6 (c)	20	—	11	152
00	94·6	41·1	(257)	4		—	—	—	—	153
00	6·1	0·8	0·3		21	107 (c)	12	—	1	154

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

No.	Food	Grams per oz.				Milligrams per oz.			
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium
155	Greengages, stewed (weighed with stones)	2·2	0·1	Tr.	9	0·3	56	3·1	1·4
156	Haddock, fresh, fried	1·0	5·8	2·4	50	50·2	99	32·4	8·7
157	Haddock, fresh, steamed	0·0	6·2	0·2	28	34·4	92	15·5	7·9
158	Haddock, smoked, steamed	0·0	6·3	0·3	28	(346)	83	16·3	7·2
159	Hake, fried	1·5	5·5	3·2	58	43·5	84	7·3	8·2
160	Hake, steamed	0·0	5·2	0·9	30	33·5	88	4·5	7·6
161	Halibut, steamed	0·0	6·4	1·1	37	31·5	97	3·7	6·6
162	Ham, boiled, lean	0·0	6·6	3·8	62	(595)	129	4·8	6·7
163	Ham, boiled, lean and fat	0·0	4·6	11·2	123	(422)	91	3·6	4·9
164	Ham or Pork, chopped	Tr.	4·3	8·5	97	(438)	63	3·4	4·7
165	Herring, fried (weighed with bones)	0·4	5·4	3·8	59	25·2	104	9·7	8·7
166	Honey	21·7	0·1	Tr.	82	3·1	15	1·5	0·6
167	Hotpot*	3·2	2·8	1·3	36	(164)	132	6·2	7·1
168	Ice cream bricks	5·0	1·1	3·8	58	18·2	51	43·4	4·3
169	Irish stew*	2·2	1·1	3·1	41	(101)	63	2·9	3·4
170	Jam	19·6	0·2	0·0	74	4·0	31	5·1	2·2
171	Jam roll, baked*	15·7	1·3	5·4	114	(43)	28	4·1	3·7
172	Jam tarts*	17·3	0·9	3·8	104	(33)	29	4·5	3·2
173	Jam tarts (economical)*	18·3	1·7	5·6	128	(47)	35	(36)	7·9
174	Jelly, packet	17·7	1·7	0·0	73	7·2	7	8·9	1·3
175	Jelly, plain*	5·4	0·6	0·0	22	2·2	2	2·7	0·4
176	Jelly, milk*	5·9	1·0	0·5	31	9·2	25	19·7	2·4
177	Kedgeree*	2·8	3·4	2·0	43	(312)	46	6·0	6·8
178	Kidney, sheep's, fried	0·0	7·9	2·6	57	74·0	86	4·7	7·6
179	Kidney, ox, stewed	0·0	7·3	1·6	45	46·5	47	5·9	6·3
180	Kipper, baked (weighed with bones)	0·0	3·6	1·7	31	(152)	80	9·9	7·3
181	Leeks, boiled	1·3	0·5	Tr.	7	1·8	79	17·2	3·6
182	Lemon juice	0·5	0·1	Tr.	2	0·4	40	2·4	1·9
183	Lentils, raw	15·1	6·8	Tr.	84	10·2	192	11·0	21·7
184	Lettuce, raw	0·5	0·3	Tr.	3	0·9	59	7·4	2·8

Milligrams per oz.				Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
Copper	Phosphorus	Sulphur	Chlorine	$\frac{N}{10}$ Acid	$\frac{N}{10}$ Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Riboflavin	Ascorbic Acid (Vitamin C)	No.
0·01	4·1	0·5	0·2		14	—	—	—	—	155
—	70·0	81·0	51·3	40		0	17 (R)	42 (R)	0	156
0·04	66·3	86·0	22·1	50		0	17 (R)	42 (R)	0	157
—	70·8	72·0	(540)	56		0	17 (R)	42 (R)	0	158
0·05	73·5	56·0	38·0	42		0	17 (R)	42 (R)	0	159
0·03	62·0	55·0	27·0	36		0	17 (R)	42 (R)	0	160
0·02	72·0	72·0	22·7	53		0	17 (R)	42 (R)	0	161
—	69·2	80·0	(950)	63		0	170 (R)	—	0	162
—	54·4	56·0	(665)	46		0		—	0	163
0·03	39·0	—	(602)	—	—	0	127	—	0	164
—	84·7	65·0	31·2	55		42 (R)	3 (R)	42 (R)	0	165
0·01	4·8	0·2	5·1		2	0	0	—	0	166
—	42·2	33·2	(253)	5		—	—	—	—	167
0·01	27·1	8·7	29·2		15	—	—	—	—	168
—	16·2	14·2	(159)		<1	—	—	—	—	169
0·05	5·1	1·3	1·8		9	6 (C)	1	—	1	170
0·03	14·7	14·4	(39)		1	—	—	—	—	171
0·03	11·9	10·5	(51)	2		—	—	—	—	172
0·09	(67)	—	(45)	—	—	—	—	—	—	173
0·05	2·0	10·4	8·5		<1	—	—	—	—	174
0·02	0·7	3·2	2·6		<1	—	—	—	—	175
0·02	14·1	7·2	16·4		4	—	—	—	—	176
—	47·8	44·8	(459)	33		—	—	—	—	177
—	123·0	78·0	82·0	88				—	0	178
—	111·0	69·0	40·9	86		284 (R)	68 (R)			
—	65·3	43·0	(234)	38		51 (R)	3 (R)	—	0	179
								—	0	180
0·03	7·8	13·9	12·1		15	198 (CR)	28 (R)	—	6 (R)	181
0·04	2·9	0·6	0·7		11	0	9	—	14	182
0·17	69·0	34·8	18·0		6	14 (C)	127	85	0	183
0·04	8·6	3·4	11·2		11	1130 (C)	21	—	4	184

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

No.	Food	Grams per oz.				Milligrams per oz.				
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium	Iro
185	Liver, raw	0·0	4·7	2·3	41	24·4	92	2·4	5·9	3·9
186	Liver, fried, after rolling in flour	0·9	8·3	4·3	78	30·4	113	2·5	7·2	6·0
187	Lobster, boiled	0·0	6·0	1·0	34	92·3	73	17·5	9·7	0·1
188	Loganberries, raw	1·0	0·3	Tr.	5	0·7	73	10·0	7·1	0·1
189	Loganberries, tinned in syrup	7·4	0·2	Tr.	29	0·3	28	5·0	3·2	0·2
190	Macaroni	21·8	3·0	0·6	102	7·3	62	7·5	16·2	0·4
191	Macaroni cheese*	4·3	2·2	3·6	59	(190)	39	56·6	7·3	0·1
192	Macaroni cheese (economical)*	3·6	1·6	1·7	36	(74)	22	41·8	4·7	0·3
193	Mackerel, fried	0·0	5·7	3·2	53	43·5	118	8·1	9·9	0·1
194	Malted milk, Horlick's	20·1	4·1	2·4	114	196·0	321	77·2	20·0	0·1
195	Margarine	0·0	0·1	24·2	226	(90)	1	1·2	0·3	0·0
196	Marmalade	19·8	Tr.	0·0	74	5·2	12	9·9	1·1	0·1
197	Marmite	0·0	2·8	Tr.	12	(1740)	978	22·0	78·4	1·4
198	Marrow, boiled	0·4	0·1	Tr.	2	0·3	24	3·9	1·9	0·3
199	Meat paste	1·2	5·6	3·6	61	(267)	59	7·5	6·2	1·3
200	Melon, Cantaloupe or Yellow, raw	1·4	0·2	Tr.	6	4·7	77	4·7	4·8	0·1
201	Milk, fresh, whole raw or pasteurised	1·3	0·9	1·1	19	14·2	46	34·1	4·0	0·0
202	Milk, fresh, skimmed	1·4	1·0	0·1	10	14·8	47	35·2	4·1	0·0
203	Milk, dried, whole	10·4	7·5	8·5	150	113·5	363	272·0	31·8	0·2
204	Milk, dried, skimmed (Household)	14·0	9·7	0·1	93	170·0	378	359·0	31·5	0·2
205	Milk, whole, evaporated, unsweetened	3·3	2·2	2·4	44	45·8	143	82·5	9·9	0·3
206	Milk, whole, condensed, sweetened	15·9	2·3	3·4	100	40·7	116	97·5	10·2	0·2
207	Milk, skimmed, condensed, sweetened	17·0	2·8	0·1	76	51·0	142	109·0	10·7	0·2
208	Mincemeat	7·2	0·2	0·9	37	(59)	159	14·9	5·9	0·2
209	Mince pies*	12·2	1·3	5·6	103	(43)	76	7·9	5·1	0·2
210	Mushrooms, fried	0·0	0·6	6·4	62	3·1	161	1·0	4·6	0·2
211	Mustard, powder	5·9	8·2	8·1	132	1·0	268	95·0	73·0	3·2
212	Mustard and cress	0·3	0·5	Tr.	3	5·4	96	18·7	7·8	1·2

Milligrams per oz.				Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
pp-er	Phos-phorus	Sul-phur	Chlo-rine	N/10 Acid	N/10 Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Ribo-flavin	Ascorbic Acid (Vitamin C)	No.
65	89·0	68·0	28·4	67		1130 to 12,800	113	850	0	185
—	159·8	119·0	28·7	137		—	—	—	0	186
—	80·5	146·0	149·0	109		—	—	—	0	187
04	6·9	5·1	4·5		21	20 (C)	6	—	9	188
01	6·5	0·9	1·3		7	10 (C)	3	—	3	189
02	43·1	27·0	8·9	11		0	21	—	0	190
01	45·9	19·7	(301)		<1	—	—	—	—	191
03	35·5	—	(126)	—	—	—	—	—	—	192
06	79·5	60·0	32·4	36		0	17 (R)	—	0	193
35	114·0	47·5	146·0		78	—	—	—	—	194
01	3·4	3·4	(141)	4		570†	0	0	0	195
03	3·6	0·6	2·0		8	0	1	—	2	196
56	535·0	108·0	(2200)		49	—	—	—	—	197
01	3·6	1·6	3·9		5	9 (CR)	13 (R)	—	1 (R)	198
03	38·0	37·0	(426)	27		0	—	—	0	199
01	5·6	2·6	12·6		19	—	—	—	—	200
01	27·0	8·3	27·8		8	20–40	13	42	0·3	201
01	27·8	8·5	28·9		8	0	13	42	0·4	202
05	215·5	66·1	222·0		61	304	85	326	2·0	203
40	298·0	85·0	321·0		41	9	111	454	2·0	204
03	72·0	21·3	79·0		24	98	18	105	0	205
02	68·0	23·5	81·0		24	105	30	105	0·9	206
01	76·8	26·8	88·0		31	6	36	122	0·9	207
02	4·5	8·1	(129)		35	—	—	—	—	208
02	14·3	16·5	(116)		3	—	—	—	—	209
22	47·2	20·9	29·3	5		—	26 (R)	—	0	210
06	50·0	364·0	18·0	88		—	—	—	—	211
03	18·6	48·2	25·3	7		—	—	—	—	212

† Vitaminised.

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

No.	Food	Grams per oz.				Milligrams per oz.				
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium	I
213	Mutton, leg, boiled	0·0	7·3	4·7	74	18·2	78	1·0	7·8	
214	Mutton, leg, roast	0·0	7·1	5·8	83	20·1	98	1·2	7·5	
215	Mutton chop or cutlet, grilled	0·0	5·7	12·8	142	29·0	87	5·1	6·5	
216	Mutton, neck, stewed	0·0	6·9	6·9	92	18·8	53	14·2	7·6	
	Nuts—									
217	Almonds	1·2	5·8	15·2	170	1·6	243	70·0	73·0	
218	Barcelona	1·5	3·7	18·2	189	0·7	266	48·2	57·2	
219	Brazil	1·2	3·9	17·3	183	0·4	216	50·0	117·0	
220	Chestnuts	10·4	0·7	0·8	49	3·1	141	13·1	9·4	
221	Cobnuts	1·9	2·6	10·2	113	0·4	98	12·5	15·9	
222	Coconut, fresh	1·1	1·1	10·2	104	4·7	124	3·7	14·8	
223	Coconut, desiccated	1·8	1·9	17·6	178	8·1	214	6·4	25·5	
224	Peanuts	2·4	8·0	13·9	171	1·6	193	17·3	51·3	
225	Walnuts	1·4	3·6	14·6	156	0·8	195	17·3	37·2	
226	Oatmeal or Quaker oats, raw	20·6	3·4	2·5	115	9·5	104	15·8	32·0	
227	Olives, in brine (weighed with stones)	0·0	0·2	2·5	24	(510)	21	14·0	5·0	
228	Olive oil	0·0	Tr.	28·4	264	Tr.	Tr.	0·1	0·1	
229	Omelette, Cheese*	0·0	5·0	8·8	102	(402)	42	89·9	7·3	
230	Omelette, Jam*	7·5	2·7	4·1	78	(34)	39	13·9	3·3	
231	Omelette, Plain*	0·0	2·2	8·6	89	(286)	26	11·1	2·4	
232	Onions, raw	1·5	0·3	Tr.	7	2·9	39	8·9	2·2	
233	Onions, boiled	0·8	0·2	Tr.	4	1·9	22	6·9	1·4	
234	Onions, fried	2·9	0·5	9·5	101	5·7	76	17·4	4·2	
235	Onions, Spring, raw	2·4	0·3	Tr.	10	3·7	64	38·4	3·1	
236	Onion sauce*	2·0	0·7	1·6	25	(86)	36	21·7	3·1	
237	Oranges, raw	2·4	0·2	Tr.	10	0·8	56	11·7	3·7	
238	Orange juice	2·7	0·2	Tr.	11	0·5	51	3·3	3·3	
239	Ovaltine	17·5	3·8	2·2	101	70·8	312	96·1	39·8	
240	Oxo	0·0	9·0	1·1	47	(3010)	761	28·8	45·4	
241	Pancakes*	10·6	1·4	4·3	85	(25)	37	20·8	4·0	
242	Parsnips, raw	3·2	0·5	Tr.	14	47·0	97	15·6	6·4	
243	Parsnips, boiled	3·8	0·4	Tr.	16	1·2	83	10·1	3·7	
244	Pastry, flaky*	12·4	1·5	10·2	147	(62)	23	3·3	3·8	
245	Pastry, short*	15·5	1·9	8·6	146	(70)	28	4·0	4·7	
246	Pastry, short (economical)*	17·0	2·4	8·3	152	(68)	36	(52)	10·9	
247	Peas, fresh, raw	3·0	1·6	Tr.	18	0·1	97	4·3	8·6	

Milligrams per oz.				Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
Copper	Phosphorus	Sulphur	Chlorine	$\frac{N}{10}$ Acid	$\frac{N}{10}$ Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Riboflavin	Ascorbic Acid (Vitamin C)	No.
0·07	67·5	80·0	19·0	64					0	213
—	68·8	77·0	17·6	57					0	214
0·05	58·0	60·0	25·5	40		14 (R)	45 (R)	71 (R)	0	215
—	62·5	74·0	23·3	57					0	216
0·04	125·5	41·2	0·5		52	0	68	—	0	217
0·27	85·0	50·0	9·5		52	0	—	—	0	218
0·31	168·0	83·0	17·3		13	0	—	—	0	219
0·07	21·0	8·2	4·3		32	0	—	—	0	220
0·06	65·0	21·3	1·7	11		0	—	—	0	221
0·09	27·0	13·0	32·4		14	0	—	—	0	222
0·16	46·0	21·6	55·8		24	0	—	—	0	223
0·08	104·0	107·0	1·9	33		0	255	—	0	224
0·09	145·0	29·5	6·5	24		0	128	—	0	225
0·07	108·0	44·0	20·8	38		0	85	—	0	226
0·05	3·8	8·1	(855)	9		—	—	—	—	227
0·02	Tr.	Tr.	Tr.		<1	—	—	—	—	228
0·02	100·9	60·7	(620)	40		—	—	—	—	229
0·02	50·0	39·0	(41)	34		—	—	—	—	230
0·01	40·7	31·4	(431)	29		—	—	—	—	231
0·02	8·5	14·4	5·5		1	0	9	—	3	232
0·02	4·7	6·7	1·4		1	—	—	—	—	233
0·05	16·8	24·9	10·8		5	—	—	—	—	234
0·04	6·7	14·2	10·1		24	198 (C)	6	—	6	235
0·02	17·9	7·9	(137)		6	—	—	—	—	236
0·02	6·7	2·6	0·9		17	85 (C)	21	—	16	237
0·01	6·2	1·3	0·3		13	—	—	—	—	238
0·18	160·0	52·0	115·0		24	—	—	—	—	239
0·09	310·0	91·0	(3980)		180	—	—	—	0	240
0·01	26·4	15·9	(43)	5		—	—	—	—	241
0·03	19·6	4·7	11·5		21	57 (C)	34	—	3	242
0·03	9·0	4·1	9·3		19	—	—	—	—	243
0·01	17·0	18·2	(100)	13		—	—	—	—	244
0·02	20·9	22·3	(113)	15		—	—	—	—	245
0·08	(98)	—	(67)	—	—	—	—	—	—	246
0·07	29·5	14·2	10·8		3	142 (C)	119	—	9	247

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

		Grams per oz.				Milligrams per oz.				
No.	Food	Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium	
248	Peas, fresh, boiled	2·2	1·4	Tr.	14	Tr.	49	3·6	6·1	«
249	Peas, dried, boiled	5·4	2·0	Tr.	28	3·6	76	6·9	8·6	«
250	Peaches, fresh, raw (weighed with stones)	2·3	0·2	Tr.	9	0·7	64	1·2	2·0	«
251	Peaches, dried, raw	15·0	1·0	Tr.	61	1·7	314	10·1	15·4	
252	Peaches, dried, stewed	5·1	0·3	Tr.	20	0·6	107	3·4	5·2	«
253	Peaches, tinned in syrup	4·9	0·1	Tr.	19	0·4	43	1·0	1·8	«
254	Pears, eating, raw (weighed with skin and core)	2·2	0·1	Tr.	9	0·5	26	1·6	1·5	«
255	Pears, stewed	1·8	0·1	Tr.	7	0·5	20	1·4	0·8	«
256	Pears, tinned in syrup	4·7	0·1	Tr.	18	0·4	26	1·5	1·7	«
257	Pepper	19·3	2·5	0·6	88	2·0	12	36·0	13·0	
258	Pilchards, tinned	0·0	5·4	4·4	63	(163)	82	54·0	10·8	«
259	Pineapple, fresh	3·3	0·1	Tr.	13	0·5	70	3·5	4·8	«
260	Pineapple, tinned in syrup	4·7	0·1	Tr.	18	0·1	16	3·8	2·3	«
261	Plaice, fried	2·0	5·1	4·1	66	35·3	62	12·7	6·9	«
262	Plaice, steamed	0·0	5·1	0·5	26	34·0	79	10·7	6·8	«
263	Plums, dessert, raw (weighed with stones)	2·6	0·2	Tr.	10	0·5	50	2·9	1·9	«
264	Plums, stewed (weighed with stones)	1·1	0·1	Tr.	5	0·4	36	2·5	1·4	«
265	Plum tart*	9·1	0·7	2·7	62	(22)	34	3·0	2·5	«
266	Pork, loin, roast	0·0	5·5	11·5	129	17·0	82	2·1	5·1	«
267	Pork chop, grilled	0·0	5·3	14·3	155	16·8	73	2·4	4·2	«
268	Pork salt, boiled (lean only)	0·0	6·7	4·5	69	(511)	85	7·8	6·9	«
269	Porridge ($2\frac{1}{2}$ oz. oatmeal per pint water)	2·3	0·4	0·3	13	(164)	12	1·8	3·7	«
270	Potatoes, old, raw	5·9	0·6	Tr.	25	1·9	161	2·2	6·9	«
271	Potatoes, old, boiled	5·6	0·4	Tr.	23	1·0	92	1·2	4·3	«
272	Potatoes, old, baked in skins	7·1	0·7	Tr.	30	2·2	193	2·6	8·3	«
273	Potatoes, " chips "	10·6	1·1	2·6	68	3·3	290	3·9	12·3	«

Milligrams per oz.				Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
op-per	Phos-phorus	Sul-phur	Chlo-rine	N/10 Acid	N/10 Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Ribo-flavin	Ascorbic Acid (Vitamin C)	No.
·04	23·6	12·4	2·2	4		—	—	—	—	248
·05	32·1	11·1	2·6		3	57 (CR)	127 (R)	85 (R)	0	249
·01	4·6	1·4	Tr.		15	185 (C)	5	—	3	250
·18	33·0	68·1	3·0		34	—	—	—	—	251
·06	11·2	23·2	1·0		12	—	—	—	—	252
·02	2·8	0·3	1·2		11	142 (C)	3	—	1	253
·03	2·0	0·9	Tr.		7	1	4	—	1	254
·02	2·9	0·7	0·3		4	—	—	—	—	255
·01	1·5	0·4	0·8		7	0	3	—	0	256
·32	37·0	28·0	17·0		82	—	—	—	—	257
·05	77·0	60·0	(247)	28		0	—	—	—	258
·02	2·2	0·7	8·1		20	28 (C)	21	—	6	259
·01	1·4	0·8	1·2		6	18 (C)	14	—	3	260
·04	71·3	71·0	49·4	61		0	17 (R)	42 (R)	0	261
—	70·0	71·0	31·8	52		0				262
·03	4·3	0·9	Tr.		13	107 (C)	12	—	1	263
·02	2·7	0·9	Tr.		10	—	—	—	—	264
·02	8·2	7·4	(35)		2	—	—	—	—	265
·03	53·0	57·0	21·8	42		0	204 (R)	—	0	266
·03	51·0	54·0	20·4	40		0				267
—	62·1	69·0	(880)	78		0	—	—	0	268
·01	12·2	5·1	(253)	4		0	—	—	0	269
·04	11·4	9·8	22·3		29	0	34	14	2 to 9	270
·03	8·2	6·3	11·6		16	—	—	—	—	271
·05	13·7	11·8	26·8		35	—	—	—	—	272
·08	20·6	12·7	39·8		56	0	—	—	2 to 9	273

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

No.	Food	Grams per oz.				Milligrams per oz.			
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium
274	Potatoes, roast	7·8	0·8	0·3	35	2·4	211	2·9	9·1
275	Potatoes, new, boiled	5·2	0·5	Tr.	21	11·5	94	1·4	5·6
276	Potato cakes (economical) *	10·0	1·0	0·1	43	(177)	104	6·9	7·7
277	Potato soup*	3·1	0·6	1·2	26	(94)	27	13·1	4·5
278	Prunes, stewed (weighed with stones)	4·4	0·3	Tr.	18	1·3	95	4·1	2·9
279	Queen of puddings*	6·6	1·5	2·8	57	(36)	41	24·8	4·1
280	Rabbit, stewed	0·0	7·6	2·2	51	9·1	60	3·2	6·1
281	Radish, raw	0·8	0·3	Tr.	4	16·8	68	12·4	3·2
282	Raisins, dried	18·3	0·3	Tr.	70	14·9	244	17·2	11·8
283	Raspberries, raw	1·6	0·3	Tr.	7	0·7	64	11·6	6·2
284	Raspberries, stewed	1·1	0·2	Tr.	5	0·5	43	7·9	4·2
285	Red currants, raw	1·2	0·3	Tr.	6	0·7	78	10·2	3·6
286	Red currants, stewed	0·9	0·2	Tr.	5	0·5	57	7·4	2·6
287	Rhubarb, stewed	0·2	0·1	Tr.	1	0·4	85	20·4	2·7
288	Rhubarb tart*	8·5	0·7	2·7	60	(22)	69	15·8	3·4
289	Rice, polished, raw	24·6	1·8	0·3	102	1·8	32	1·1	3·7
290	Rice, boiled	8·4	0·6	0·1	35	0·6	11	0·4	1·3
291	Rice pudding*	5·9	1·3	2·6	52	(18)	54	39·0	4·8
292	Rice pudding (economical)*	5·4	1·4	0·7	33	(23)	48	42·3	4·1
293	Roe, Cod's, fried	0·9	5·8	3·4	59	36·0	73	4·8	3·0
294	Roe, Herring, fried	1·3	6·6	4·5	74	24·6	68	4·5	2·3
295	Ryvita	22·4	1·9	0·6	106	(175)	133	11·5	25·7
296	Sago	26·7	0·1	0·1	101	1·0	1	2·8	0·7
297	Sago pudding*	5·8	0·9	1·1	35	13·5	43	32·8	3·9
298	Salmon, fresh, steamed	0·0	5·4	3·7	57	30·4	95	8·2	8·1
299	Salmon, tinned	0·0	5·6	1·7	39	(152)	91	18·8	8·5
300	Sardines, tinned	0·0	5·8	6·4	84	(223)	123	116·2	11·7
301	Sausage, Beef, fried	4·5	3·9	5·2	81	(321)	72	6·0	4·7
302	Sausage, Pork, fried	3·6	3·3	7·1	93	(284)	58	5·6	4·2
303	Sausage roll*	10·1	2·1	10·2	141	(115)	32	3·8	3·8
304	Sausage roll (economical)*	13·3	2·9	7·4	130	(126)	54	(42)	12·5
305	Scones (with egg)*	16·9	2·4	3·0	102	(48)	42	13·4	5·7
306	Scones (without egg)*	16·2	2·2	3·8	106	(47)	46	17·9	6·1
307	Scotch egg*	2·9	3·1	5·5	75	(153)	47	10·1	4·0
308	Scrambled eggs*	0·2	2·9	7·1	79	(358)	38	17·4	3·4

Milligrams per oz.				Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
...r	Phosphorus	Sulphur	Chlorine	$\frac{N}{10}$ Acid	$\frac{N}{10}$ Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Riboflavin	Ascorbic Acid (Vitamin C)	No.
...6	15·1	16·0	29·3		36	—	—	—	—	274
...4	9·4	6·9	12·9		20	0	34 (R)	14 (R)	9 (R)	275
...5	17·9	—	(283)	—	—	—	—	—	—	276
...2	14·8	8·4	(155)	<1		—	—	—	—	277
...2	9·1	2·0	0·3		22	710 (CR)	0	—	0	278
...2	31·9	17·0	(53)	5		—	—	—	—	279
...6	56·5	70·0	12·2	57		0	9 (R)	—	0	280
...4	7·7	10·6	5·3		20	0	17	—	9	281
...7	9·3	6·5	2·4		76	14 (C)	0	—	0	282
...6	8·2	4·9	6·3		17	20 (C)	6	—	9	283
...4	5·5	3·3	4·3		12	—	—	—	—	284
...3	8·4	8·1	4·0		17	7 (C)	13	—	13	285
...2	6·1	5·9	2·9		12	—	—	—	—	286
...4	4·2	1·6	17·3		26	—	—	—	—	287
...2	9·3	7·9	(47)		14	—	—	—	—	288
...2	28·0	22·4	7·7	22		0	23	—	0	289
...1	9·5	7·6	2·6	7		—	—	—	—	290
...1	34·2	12·1	(38)		5	—	—	—	—	291
...5	38·4	—	(42)	—	—	—	—	—	—	292
-	143·0	68·0	53·2	110		—	425 (R)	—	0	293
-	260·0	69·0	34·9	188		—	9 (R)	—	0	294
...4	83·9	24·7	(266)	7		—	—	—	—	295
...1	8·1	0·1	3·6	4		0	0	—	0	296
...1	25·9	7·8	26·6		8	—	—	—	—	297
-	85·8	54·0	18·2	46		—	17 (R)	42 (R)	0	298
...1	81·0	67·0	(246)	57		71	34	—	0	299
...1	194·0	80·0	(342)	75		77	—	—	0	300
...5	47·7	46·0	(503)	37		3 (R)	43 (R)	—	0	301
...4	40·0	27·0	(397)	10		0	48 (R)	—	0	302
...2	22·6	20·3	(173)	13		—	—	—	—	303
...9	(87)	—	(154)	—	—	—	—	—	—	304
...2	33·4	28·7	(36)	7		—	—	—	—	305
...2	31·0	24·2	(35)		1	0	45	—	0	306
...2	47·2	35·8	(210)	25		—	—	—	—	307
...1	54·0	41·0	(540)	36		—	—	—	—	308

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

No.	Food	Grams per oz.				Milligrams per oz.			
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium
309	Scrambled eggs (with dried egg)*	0·0	3·7	7·4	84	(430)	41	16·3	3·6
310	Semolina	22·0	3·0	0·5	100	3·4	47	5·2	9·1
311	Semolina pudding*	5·5	1·2	1·1	37	14·3	49	34·0	4·8
312	Shepherd's pie*	3·5	2·0	1·5	35	(105)	83	4·3	4·7
313	Shortbread*	18·2	1·7	7·7	148	(24)	26	4·5	4·3
314	Shredded Wheat	22·4	2·8	0·8	103	4·7	86	9·9	34·1
315	Skate, fried	2·1	4·3	4·7	69	51·8	67	5·5	6·6
316	Sole, fried	1·5	5·7	5·2	78	54·5	67	37·2	7·9
317	Sole, steamed	0·0	5·0	0·4	24	31·2	68	32·1	8·0
318	Soya, Full fat flour	3·8	11·5	6·7	123	—	472	59·3	66·8
319	Soya, Low fat flour	4·9	14·1	2·0	95	—	575	68·5	81·2
320	Spinach, cooked without added water	0·4	1·4	Tr.	7	34·9	139	169·0	16·8
321	Spring greens, boiled	0·3	0·5	Tr.	3	2·9	34	24·4	2·4
322	Steak and kidney pie*	4·8	4·4	5·4	85	(225)	69	2·9	5·9
323	Stout (per pint)†	23·0	2·2	Tr.	282	117·0	381	58·0	65·0
324	Strawberries, raw	1·8	0·2	Tr.	7	0·4	46	6·3	3·3
325	Suet	0·0	0·3	28·1	262	6·0	4	1·7	0·3
326	Suet pudding, plain*	10·4	1·1	5·1	92	(57)	27	12·7	3·5
327	Suet pudding with raisins*	11·6	1·0	4·4	90	(51)	58	13·1	4·7
328	Suet pudding with sultanas (economical)*	11·0	1·2	2·6	70	(20)	53	(32)	5·6
329	Sugar, Demerara	28·2	0·1	0·0	112	1·8	25	4·9	4·2
330	Sugar, White	28·4	Tr.	0·0	112	0·1	1	0·4	0·1
331	Sultanas, dried	18·4	0·5	Tr.	71	15·0	243	14·9	10·0
332	Swedes, raw	1·2	0·3	Tr.	6	14·8	39	16·0	3·1
333	Swedes, boiled	1·1	0·3	Tr.	5	4·1	29	11·8	2·0
334	Sweetbread, stewed	0·0	6·4	2·6	51	19·6	66	4·1	4·4
335	Syrup sponge pudding (economical)*	15·3	1·5	4·2	101	(47)	36	(26)	5·3
336	Tapioca	27·0	0·1	Tr.	102	1·2	6	2·3	0·6
337	Tapioca pudding*	5·9	0·9	1·1	36	13·8	44	32·9	3·9
338	Tea, as purchased	0·0	4·4	0·0	17	12·6	612	121·0	72·0
339	Toad-in-the-hole*	5·3	2·2	5·8	83	(199)	46	19·0	4·5
340	Tomatoes, raw	0·8	0·3	Tr.	4	0·8	82	3·8	3·1

† Contains 26·7 c.c. alcohol per pint.

Milligrams per oz.				Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
p-er	Phos-phorus	Sul-phur	Chlo-rine	N/10 Acid	N/10 Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Ribo-flavin	Ascorbic Acid (Vitamin C)	No.
02	68·7	53·5	(680)	61		—	—	—	—	309
04	32·4	26·0	20·2	19		0	26	—	0	310
01	29·7	10·7	29·3		5	—	—	—	—	311
–	25·1	22·8	(166)	4		—	—	—	—	312
02	19·6	19·5	(40)	13		—	—	—	—	313
13	81·5	24·6	20·2	16		0	57	—	0	314
–	67·8	61·0	75·7	55		0			0	315
–	73·9	75·0	54·9	44		0	17 (R)	42 (R)	0	316
–	76·8	67·0	37·5	48		0			0	317
–	169·5	—	—	—	—	0	187	—	0	318
–	183·0	—	—	—	—	0	247	—	0	319
07	26·4	24·6	15·8		112	3690 (CR)	28 (R)	—	18 (R)	320
02	8·7	8·1	4·6		12	—	—	—	—	321
–	60·5	44·4	(339)	40		—	—	—	—	322
67	130·0	130·0	200·0		10	0	22	—	0	323
04	6·5	3·8	5·0		10	4 (C)	6	—	17	324
01	2·0	5·7	5·1	2		—	0	0	0	325
01	17·0	11·4	(44)		11	—	—	—	—	326
02	15·7	10·6	(38)		20	—	—	—	—	327
05	(50)	—	12·0	—	—	—	—	—	—	328
02	5·7	4·0	10·0		9	0	0	0	0	329
01	Tr.	Tr.	Tr.		<1	0	0	0	0	330
10	26·8	12·6	4·4		58	14 (C)	0	—	0	331
01	5·4	11·1	8·7		14	0	10	—	11	332
01	5·2	8·7	2·6		8	—	—	—	—	333
–	169·3	53·0	21·0	117		—	—	—	—	334
04	(50)	—	(35)	—	—	—	—	—	—	335
02	11·1	1·0	3·7	3		0	0	0	0	336
01	27·0	8·1	27·1		7	—	—	—	—	337
45	178·0	50·2	14·7		132	—	—	—	0	338
02	35·5	22·8	(297)	9		—	—	—	—	339
03	6·1	3·0	14·5		16	850 (C)	17	—	7	340

THE CHEMICAL COMPOSITION OF FOODS—(*continued*)

No.	Food	Grams per oz.				Milligrams per oz.			
		Carbohydrate	Protein	Fat	Calories per oz.	Sodium	Potassium	Calcium	Magnesium
341	Tomatoes, fried	0·9	0·3	1·7	20	0·9	95	4·4	3·6
342	Tongue, Ox, pickled in salt and sugar	0·7	5·4	6·8	88	(532)	43	8·8	4·6
343	Tongue, Sheep's, stewed	0·0	5·1	6·8	84	22·5	31	3·2	3·7
344	Treacle tart*	17·8	1·0	3·8	107	(73)	45	5·5	3·3
345	Trifle*	7·8	1·1	1·1	45	(14)	43	28·2	3·9
346	Tripe, stewed	0·0	5·1	0·9	29	20·4	3	36·1	2·2
347	Turkey, roast	0·0	8·6	2·2	56	36·9	104	10·9	8·0
348	Turnips, raw	1·1	0·2	Tr.	5	16·5	68	16·7	2·1
349	Turnips, boiled	0·7	0·2	Tr.	3	8·0	45	15·6	1·9
350	Veal, roast	0·0	8·7	3·3	66	27·5	122	4·1	7·9
351	Vinegar	0·2	0·1	0·0	1	6·0	25	4·0	6·0
352	Virol	16·9	1·3	2·2	102	(106)	102	30·6	17·4
353	Vita-Weat	19·4	2·4	2·9	120	(172)	122	12·5	33·4
354	Watercress, raw	0·2	0·8	Tr.	4	17·0	89	63·0	4·8
355	Welsh rarebit*	5·9	4·3	10·1	133	(146)	34	116·4	9·3
356	White sauce, savoury*	2·8	1·1	2·8	41	(148)	46	32·2	4·2
357	White sauce, sweet*	5·0	1·0	2·5	47	18·0	42	29·5	3·8
358	Yorkshire pudding*	7·6	2·0	2·7	62	(117)	49	28·7	5·2
359	Yorkshire pudding (economical)*	8·0	1·7	3·2	67	(158)	23	(44)	6·0

Milligrams per oz.				Acid-Base Value c.c. per oz.		I.U. per oz.	Micrograms per oz.		Mg. per oz.	
Copper	Phosphorus	Sulphur	Chlorine	N/10 Acid	N/10 Alkali	Vitamin A Potency	Aneurin (Vitamin B_1)	Riboflavin	Ascorbic Acid (Vitamin C)	No.
03	7·1	2·6	16·8		19	—	—	—	—	341
—	65·0	57·0	(851)	67		0	80	—	0	342
—	56·0	53·0	22·7	53	—	—	—	—	0	343
02	13·1	17·8	(68)		10	—	—	—	—	344
01	27·2	11·2	(26)		3	—	—	—	—	345
—	37·5	41·0	8·5	23		—	—	—	—	346
—	91·0	66·0	34·9	55		—	—	—	—	347
02	7·8	6·3	19·9		18	0	10	—	7	348
01	5·4	6·0	8·9		15	—	—	—	—	349
—	101·0	94·0	32·1	81		14 (R)	23 (R)	71 (R)	0	350
01	9·0	5·0	13·0		3	—	—	—	0	351
13	75·5	23·5	(169)	9		—	—	—	—	352
05	106·0	26·5	(240)	12		—	—	—	—	353
04	14·8	36·1	44·4		21	1420 (C)	34	—	17	354
02	85·7	38·3	(245)	8		—	—	—	—	355
01	27·3	10·1	(236)		6	—	—	—	—	356
01	25·0	9·3	34·0		5	—	—	—	—	357
02	36·4	21·1	(188)	8		—	—	—	—	358
06	(84)	—	(201)	—	—	—	—	—	—	359

TABLE II

IMPORTANT FOOD SOURCES OF VITAMIN D

	Vitamin D (I.U. per oz.)
Cod liver oil, Ministry of Food	5,700
Sardines, tinned	280
Herring, fresh and cured	240
Mackerel	200
Salmon, tinned	170
Egg, dried	70
Margarine, vitaminised	57
Herring, tinned	48
Egg, whole, fresh	17
Butter, Empire, imported	17
Dripping	9
Cheese	4
Milk powder, whole	3
Milk, condensed, whole, unsweetened	1
Milk, condensed, whole, sweetened	0·7
Milk, fresh, whole	0·3

TABLE III

"READY RECKONER" FOR THE CALCULATION OF CARBOHYDRATE, PROTEIN, AND FAT IN COMMON FOODS, AND THEIR CALORIFIC VALUE

MILK, FRESH

Milk. g.	C. g.	P. g.	F. g.	Cals.
5	0·2	0·2	0·2	3
10	0·5	0·3	0·4	7
20	0·9	0·7	0·7	13
30	1·4	1·0	1·1	20
40	1·8	1·3	1·5	27
50	2·3	1·7	1·8	34
60	2·8	2·0	2·2	40
70	3·2	2·3	2·6	46
80	3·7	2·6	3·0	53
90	4·1	3·0	3·3	59
100	4·6	3·3	3·7	66

CREAM

Cream. g.	C. g.	P. g.	F. g.	Cals.
5	0·1	0·1	2·1	20
10	0·2	0·2	4·2	41
20	0·5	0·4	8·4	81
30	0·7	0·5	12·6	122
40	0·9	0·7	16·8	163
50	1·1	0·9	21·0	203
60	1·4	1·1	25·2	244
70	1·6	1·3	29·4	284
80	1·8	1·4	33·6	325
90	2·1	1·6	37·8	365
100	2·3	1·8	42·0	406

BUTTER

Butter. g.	C. g.	P. g.	F. g.	Cals.
5	—	—	4·3	40
10	—	—	8·5	79
20	—	0·1	17·0	158
30	—	0·1	25·6	237
40	—	0·2	34·1	316
50	—	0·2	42·6	396
60	—	0·2	51·1	475
70	—	0·3	59·6	554
80	—	0·3	68·1	633
90	—	0·4	76·6	712
100	—	0·4	85·1	793

CHEESE, CHEDDAR, OR SOFT WHOLE MILK

Cheese.	C.	P.	F.	
g.	g.	g.	g.	Cals.
5	—	1·2	1·7	21
10	—	2·5	3·5	42
20	—	5·0	6·9	85
30	—	7·5	10·4	127
40	—	9·9	13·8	169
50	—	12·5	17·3	211
60	—	14·9	20·7	254
70	—	17·4	24·2	296
80	—	19·9	27·6	338
90	—	22·4	31·1	381
100	—	24·9	34·5	423

MEAT, LEAN, COOKED

Meat.	C.	P.	F.	
g.	g.	g.	g.	Cals.
5	—	1·7	0·4	11
10	—	3·3	0·8	21
20	—	6·6	1·6	43
30	—	10·0	2·5	64
40	—	13·4	3·3	85
50	—	16·7	4·1	106
60	—	20·0	4·9	128
70	—	23·3	5·7	149
80	—	26·7	6·6	170
90	—	30·0	7·4	191
100	—	33·3	8·2	213

MEAT, AVERAGE, COOKED

Meat.	C.	P.	F.	
g.	g.	g.	g.	Cals.
5	—	1·3	1·0	15
10	—	2·5	2·0	29
20	—	5·0	4·1	59
30	—	7·5	6·1	88
40	—	10·0	8·2	117
50	—	12·5	10·2	146
60	—	15·0	12·2	176
70	—	17·5	14·3	205
80	—	20·0	16·3	234
90	—	22·5	18·4	264
100	—	25·0	20·4	293

CHICKEN OR RABBIT, BOILED

Chicken.	C.	P.	F.	
g.	g.	g.	g.	Cals.
5	—	1·3	0·5	10
10	—	2·6	1·0	20
20	—	5·2	2·1	41
30	—	7·9	3·1	61
40	—	10·5	4·1	82
50	—	13·1	5·2	102
60	—	15·7	6·2	122
70	—	18·4	7·2	142
80	—	21·0	8·2	163
90	—	23·6	9·3	183
100	—	26·2	10·3	203

BACON, RAW

Bacon.	C.	P.	F.	
g.	g.	g.	g.	Cals.
5	—	0·6	2·7	28
10	—	1·3	5·4	55
20	—	2·5	10.8	111
30	—	3·8	16·2	166
40	—	5·0	21·6	221
50	—	6·3	27·0	276
60	—	7·5	32·4	332
70	—	8·8	37·8	387
80	—	10·0	43·2	443
90	—	11·3	48·6	498
100	—	12·5	54·0	553

HAM, LEAN, BOILED

Ham.	C.	P.	F.	
g.	g.	g.	g.	Cals.
5	—	1·2	0·7	11
10	—	2·3	1·3	22
20	—	4·6	2·7	44
30	—	6·9	4·0	66
40	—	9·2	5·4	88
50	—	11·5	6·7	110
60	—	13·8	8·1	132
70	—	16·1	9·4	154
80	—	18·4	10·8	175
90	—	20·7	12·1	197
100	—	23·1	13·4	219

FISH, STEAMED

Fish. g.	C. g.	P. g.	F. g.	Cals.
5	—	0.9	—	4
10	—	1·8	0·1	8
20	—	3·6	0·2	16
30	—	5·4	0·3	25
40	—	7·2	0·4	33
50	—	9·0	0·5	41
60	—	10·8	0·5	49
70	—	12·6	0·6	57
80	—	14·4	0·7	65
90	—	16·2	0·8	74
100	—	18·0	0·9	82

HERRINGS, COVERED WITH OATMEAL AND FRIED

Herrings. g.	C. g.	P. g.	F. g.	Cals.
5	0·1	1·1	0·8	12
10	0·2	2·2	1·5	24
20	0·3	4·4	3·0	47
30	0·5	6·5	4·5	71
40	0·6	8·7	6·0	94
50	0·8	10·9	7·6	118
60	0·9	13·1	9·1	142
70	1·1	15·2	10·6	165
80	1·2	17·4	12·1	189
90	1·4	19·6	13·6	212
100	1·5	21·8	15·1	235

JAM OR MARMALADE

Jam. g.	C. g.	P. g.	F. g.	Cals.
5	3·5	—	—	13
10	6·9	—	—	26
20	13·9	0·1	—	52
30	20·8	0·1	—	78
40	27·7	0·2	—	105
50	34·7	0·2	—	130
60	41·6	0·2	—	157
70	48·6	0·2	—	183
80	55·5	0·3	—	208
90	62·5	0·4	—	235
100	69·4	0·4	—	261

BREAD, WHITE OR NATIONAL WHEATMEAL

Bread. g.	C. g.	P. g.	F. g.	Cals.
5	2·9	0·4	—	13
10	5·7	0·8	0·1	26
20	11·5	1·7	0·2	52
30	17·2	2·5	0·3	78
40	22·9	3·3	0·4	104
50	28·7	4·2	0·5	130
60	34·4	5·0	0·6	156
70	40·2	5·8	0·7	182
80	45·8	6·6	0·8	208
90	51·6	7·5	0·9	234
100	57·4	8·3	1·0	260

FLOUR, WHITE OR NATIONAL WHEATMEAL

Flour. g.	C. g.	P. g.	F. g.	Cals.
5	3·9	0·6	—	17
10	7·8	1·1	0·1	35
20	15·5	2·2	0·2	70
30	23·2	3·4	0·4	105
40	30·9	4·5	0·5	140
50	38·7	5·6	0·7	174
60	46·5	6·7	0·8	209
70	54·2	7·8	1·0	244
80	62·0	8·9	1·1	279
90	69·6	10·0	1·3	314
100	77·5	11·2	1·4	349

BISCUITS, WATER

Biscuits. g.	C. g.	P. g.	F. g.	Cals.
5	3·7	0·5	0·6	22
10	7·6	1·1	1·3	44
20	15·1	2·1	2·5	89
30	22·7	3·2	3·7	133
40	30·2	4·3	5·0	177
50	36·8	5·2	6·2	222
60	45·4	6·4	7·5	266
70	53·0	7·6	8·7	311
80	60·5	8·6	10·0	355
90	68·0	9·6	11·2	399
100	75·8	10·7	12·5	444

OATMEAL OR QUAKER OATS, RAW

Oatmeal. g.	C. g.	P. g.	F. g.	Cals.
5	3·6	0·6	0·4	20
10	7·3	1·2	0·9	40
20	14·6	2·4	1·7	81
30	21·8	3·6	2·6	121
40	29·1	4·8	3·5	161
50	36·4	6·0	4·4	202
60	43·7	7·3	5·2	242
70	51·0	8·5	6·1	282
80	58·2	9·7	7·0	323
90	65·5	10·9	7·8	363
100	72·8	12·1	8·7	404

RICE

Rice. g.	C. g.	P. g.	F. g.	Cals.
5	4·3	0·3	0·1	18
10	8·7	0·6	0·1	36
20	17·4	1·2	0·2	72
30	26·0	1·9	0·3	108
40	34·7	2·5	0·4	145
50	43·4	3·1	0·5	181
60	52·1	3·7	0·6	217
70	60·8	4·3	0·7	252
80	69·4	5·0	0·8	288
90	78·0	5·6	0·9	325
100	86·8	6·2	1·0	361

POTATOES, OLD, BOILED

Potatoes. g.	C. g.	P. g.	F. g.	Cals.
5	1·0	0·1	—	4
10	2·0	0·1	—	8
20	3·9	0·3	—	16
30	5·9	0·4	—	24
40	7·9	0·6	—	32
50	9·9	0·7	—	40
60	11·8	0·8	—	48
70	13·8	1·0	—	56
80	15·8	1·1	—	64
90	17·7	1·3	—	72
100	19·7	1·4	—	80

TABLE IV

PROTEIN AND FAT FOODS

The following portions contain about 7 g. protein and 7 g. fat, and may be exchanged one for another without causing any significant difference in food values.

MEAT	g.	oz.	FISH	g.	oz.
Beef, roast ..	26	1	Herring, kipper or bloater ..	32	1
Ham (lean), boiled	30	1	Salmon	37	1¼
Duck, roast ..	30	1	Sardines ..	34	1¼
Mutton, roast ..	28	1	Mackerel ..	35	1¼
Pork, roast ..	28	1			
Cheese	28	1	1 egg	57	2
With the addition of ¼ oz. butter					
Tripe, stewed ..	39	1½	White fish, steamed ..	36	1¼
Chicken, boiled or roast ..	25	1	Smoked haddock	31	1
Rabbit, stewed..	26	1			
Game, roast ..	22	¾			
Veal, roast ..	23	¾			
With the reduction of ¼ oz. butter			*With the reduction of 1 oz. butter*		
Bacon, fried ..	29	1	Bacon, raw ..	56	2

Note.—1 oz. gelatin contains 26 g. protein.

TABLE V

AMINO-ACID COMPOSITION

	Total Protein	Arginine	Histidine	Lysine	Tyrosine
Cereals					
Barley, Pearl	7·7	0·39	0·15	0·20	—
Maize, Whole	10·0	0·48	0·22	0·20	0·55
Oatmeal	12·1	0·98	0·29	0·40	—
Rice, Polished	6·2	0·59	0·16	0·19	—
Rye, Whole	8·0	0·48	0·19	0·29	—
Soya flour	49·6	4·25	1·30	3·88	—
Whole Wheat flour ..	11·6	0·57	0·26	0·32	—
Dairy Products					
Egg, Whole, Fresh ..	11·9	0·76	0·25	0·86	0·54
Egg white	9·0	0·52	0·20	0·59	0·43
Egg yolk..	16·2	1·32	0·42	—	0·85
Egg, Whole, Dried ..	43·4	4·12	1·00	3·42	—
Milk, Fresh, Whole ..	3·3	0·14	0·09	0·25	0·18
Milk, Dried, Skimmed ..	34·0	0·95	0·84	2·41	—
Meat, Raw					
Beef, muscle	19·3	1·53	0·58	1·61	0·68
Brain	10·8	0·91	0·30	0·70	0·44
Chicken, muscle.. ..	17·0	1·21	0·39	1·42	0·73
Heart	13·2	0·98	0·36	0·98	0·58
Kidney	16·8	1·06	0·45	0·93	0·81
Liver	16·5	1·09	0·51	1·10	0·76
Fruit and Vegetables					
Leafy vegetables ..	3·0	0·21	0·06	0·17	0·16
Peas	5·8	0·52	0·07	0·29	—
Peanuts	28·1	2·78	0·59	0·84	1·23

* From Block, R. J. and Mitchell, H. H. (1946). " The Correlation Value," *Nutrition Abstracts and Reviews*, vol 16, p. 249 and " Methods Acids in Proteins and Foods " (1950), *Misc. Publ. U.S. Dept. Agric.*, which are given in Table I, and the figures for the amino-acids have

— No figures available.

OF FOODS (Grams per 100 grams) *

Trypto-phane	Phenyl-alanine	Cystine	Methio-nine	Threo-nine	Leucine	Iso-leucine	Valine
0·90	0·50	—	0·90	0·31	0·65	0·39	0·44
0·08	0·50	0·15	0·31	0·37	2·20	0·40	0·50
0·14	0·61	—	0·14	0·48	1·02	0·59	0·70
0·06	0·33	—	0·10	0·24	0·59	0·30	0·43
0·07	0·40	—	0·10	0·35	0·59	0·36	0·44
0·61	2·58	—	0·54	2·48	4·08	2·66	2·67
0·11	0·52	—	0·13	0·38	0·75	0·46	0·52
0·18	0·75	0·29	0·49	0·58	1·09	0·95	0·87
0·14	0·50	0·21	0·40	—	—	—	—
0·26	0·92	0·31	0·48	—	—	—	—
0·75	3·18	—	1·19	2·57	5·45	3·78	3·04
0·05	0·19	0·03	0·01	0·15	0·37	0·28	0·28
0·38	1·51	—	0·74	1·78	3·52	2·08	2·44
0·26	0·97	0·26	0·66	0·92	1·53	1·25	1·15
0·17	0·63	0·20	0·32	0·63	0·80	0·55	0·52
0·20	0·78	0·22	0·54	0·80	—	—	—
0·18	0·67	0·16	0·42	0·62	1·11	0·69	0·83
0·29	0·93	0·25	0·45	0·77	1·34	0·94	0·89
0·23	1·00	0·23	0·53	0·79	1·38	0·92	1·02
0·06	0·14	0·06	0·07	0·12	—	—	—
0·04	0·28	0·07	0·06	0·23	0·37	0·24	0·23
0·28	1·51	0·45	0·34	0·42	1·96	0·84	2·25

of the Amino-Acid Composition of Proteins with their Nutritive for Microbiological and Chemical Determinations of Essential Amino- No. 696, Washington, D.C. The values for total protein are those been calculated to correspond with these values.

TABLE VI

*OXALIC ACID IN FOODS**

	Oxalic Acid Grams per 100 grams		Oxalic Acid Grams per 100 grams
Spinach	0·890	Potatoes	0·0057
Rhubarb	0·500	Broccoli	0·0054
Gooseberries, green	0·088	Asparagus	0·0052
Carrots	0·033	Pears	0·0030
Oranges	0·024	Cherries, cooking ..	0·0011
Redcurrants ..	0·019	Grapes	0–0·025
Strawberries ..	0·019	Peaches	0–0·005
Blackberries ..	0·018	Apples	0
Raspberries.. ..	0·015	Cauliflower	0
Turnip tops ..	0·015	Cherries, eating ..	0
Apricots	0·014	Cucumber	0
Damsons	0·010	Grapefruit	0
Parsnips	0·010	Greengages	0
Cabbage	0·0077	Lemon juice ..	0
Tomatoes	0·0075	Melons	0
Lettuce	0·0071	Nectarines	0
Bananas	0·0064	Peas	0
Pineapple, tinned ..	0·0063	Radishes	0
Prunes	0·0058	Turnips	0

* From Kohman, E. F. (1939). "Oxalic Acid in Foods and its Behaviour and Fate in the Diet," *Journal of Nutrition*, vol. 18, p. 233.

TABLE VII

ATOMIC WEIGHTS OF ELEMENTS

Element	Symbol	Atomic weights		Valency
		Approximate	International	
Calcium	Ca	40·0	40·07	2
Carbon	C	12·0	12·00	2 or 4*
Chlorine	Cl	35·5	35·457	1
Copper	Cu	63·5	63·57	1 or 2*
Hydrogen	H	1·0	1·008	1
Iodine	I	127·0	126·932	1
Iron	Fe	56·0	55·84	2 or 3*
Magnesium ..	Mg	24·0	24·32	2
Nitrogen	N	14·0	14·008	3* or 5
Oxygen	O	16·0	16·00	2
Phosphorus ..	P	31·0	31·027	2*, 3 or 5
Potassium ..	K	39·0	39·096	1
Sodium	Na	23·0	22·997	1
Sulphur	S	32·0	32·064	2*, 4 or 6

The valency used for calculating the acid-base value is marked *.

Determination of the Acid-Base Value of a Food.

The acid-base value of a foodstuff is usually expressed in terms of $\frac{N}{10}$ acid or alkali, and it may be calculated from the mineral analysis of the food. The metals, calcium, magnesium, sodium, potassium, iron, and copper contribute towards the *base* value, while the non-metals, chlorine, phosphorus, and sulphur contribute towards the *acid* value. In practice iron and copper are usually neglected since such small amounts are present.

Some foods contain more basic than acidic radicles ; these foods yield a basic ash and are said to be base-forming. Others contain more acidic radicles, and these yield an acid ash in the body.

Method of calculating the acid-base value of a food

From Table I—

1 oz. white bread contains—

0·126 g. Na
0·033 g. K
0·0066 g. Ca
0·0063 g. Mg
0·0208 g. P
0·187 g. Cl
0·0155 g. S

1,000 c.c. of a normal solution contain the atomic weight in grams of the element divided by its valency.

23 g. of Na are contained in 1,000 c.c. N. alkali.

,, ,, ,, ,, 10,000 c.c. $\frac{N}{10}$,,

0·126 ,, ,, ,, $\frac{10{,}000 \times 0{\cdot}126}{23} = 54{\cdot}8$ c.c. $\frac{N}{10}$ alkali.

0·033 g. of K are contained in $\frac{10{,}000 \times 0{\cdot}033}{39} = 8{\cdot}5$ c.c. $\frac{N}{10}$ alkali.

0·0066 ,, Ca ,, ,, $\frac{10{,}000 \times 0{\cdot}0066}{20} = 3{\cdot}3$ c.c. ,,

0·0063 ,, Mg ,, ,, $\frac{10{,}000 \times 0{\cdot}0063}{12} = 5{\cdot}2$ c.c. ,,

Base value of 1 oz. bread $= 71{\cdot}8$ c.c. ,,

0·0208 g. of P are contained in $\frac{10{,}000 \times 0{\cdot}0208}{15{\cdot}5} = 13{\cdot}4$ c.c. $\frac{N}{10}$ acid.

0·187 ,, Cl ,, ,, $\frac{10{,}000 \times 0{\cdot}187}{35{\cdot}5} = 52{\cdot}7$ c.c. ,,

0·0155 ,, S ,, ,, $\frac{10{,}000 \times 0{\cdot}0155}{16} = 9{\cdot}7$ c.c. ,,

Acid value of 1 oz. bread $= 75{\cdot}8$ c.c. ,,

Acid-base value of 1 oz. bread $= 75{\cdot}8 - 71{\cdot}8 = 4{\cdot}0$ c.c. $\frac{N}{10}$ acid.

TABLE VIII

THE VITAMINS

Vitamin	Chemical Name	International Standard	International Unit	Solubility	Results of Prolonged Deficiency and Specific Functions	Principal Sources
A	—	Pure β-carotene.	Biological activity of 0·6 microgram of standard.	Fat-soluble.	Epithelial changes giving rise to decreased local resistance to infection. Night-blindness. Overgrowth of bones of skull, compressing the brain and cranial and spinal nerves in young dogs.	Fish liver oils and fat fish. Red palm oil. Liver, butter, cheese, vitaminised margarine, egg yolk, cream, tomatoes. Green leafy vegetables such as lettuce, spinach, cabbage. Yellow root vegetables and fruits such as carrots, apricots, oranges.
D_2 (Artificial) D_3 (Naturally-occurring)	Calciferol or irradiated ergosterol. Irradiated 7-dehydrocholesterol.	Crystalline vitamin D_2 or calciferol.	Antirachitic potency of 0·025 micrograms of calciferol.	Fat-soluble.	Rickets, osteomalacia.	Fish liver oils and fat fish. Egg yolk. Butter, cream. Vitaminised margarine.
C	Ascorbic acid.	Pure l-ascorbic acid.	0·05 mg. of standard. Now measured in milligrams.	Water-soluble.	Scurvy. Essential for the formation of inter-cellular substance and wound healing. Possibly peridontal disease is due to a deficiency.	Rose hips. Black and red currants. Strawberries. Oranges. Lemons. Green vegetables.
B_1	Aneurin or thiamin.	Pure, crystalline aneurin hydrochloride.	3 micrograms of aneurin.	Water-soluble.	Beri-beri.	Whole cereals, yeast and yeast extracts, pulses, and pork.
B_2	Riboflavin.	Pure, crystalline riboflavin.	Measured in micrograms or milligrams.	Water-soluble.	Cheilosis. Sometimes angular stomatitis. Magenta tongue.	Yeast, milk, egg-white, fish roe, kidney, liver, heart, leafy vegetables.

TABLE VIII—*continued*

Vitamin	Chemical Name	International Standard	International Unit	Solubility	Results of Prolonged Deficiency and Specific Functions	Principal Sources
	Nicotinic acid.	Pure, crystalline nicotinic acid.	Measured in micrograms or milligrams.	Water-soluble.	Pellagra.	Liver, kidney, meat extract, yeast, whole cereals.
B_6	Pyridoxine.	Pure, crystalline pyridoxine.	Measured in micrograms or milligrams.	Water-soluble.	Dermatitis in rats. Fits in rats and pigs. Anæmia in dogs.	Yeast, liver, whole cereals, pulses.
Pantothenic acid.	α-hydroxy-ββ-di - methyl - butyryl - β - alanine.	Pure pantothenic acid.	Measured in micrograms or milligrams.	Water-soluble.	Failure to grow in rats and dogs. Unknown for humans.	Yeast, whole cereals, glandular tissues, peas.
B_8	Adenylic acid.	Pure adenylic acid.	Measured in micrograms or milligrams.	Water-soluble.	Forms part of enzyme system concerned in catalysing oxidation–reduction mechanisms in cells.	Yeast, whole cereals, glandular tissues.
B_{12}	—	—	Measured in micrograms.	Water-soluble.	Vitamin B_{12} produces a remission in pernicious anæmia and nutritional macrocytic anæmia, and the anæmia of sprue. Possibly also has a curative effect on the neurological complications of pernicious anæmia.	Liver.
	Folic acid.	Crystalline folic acid.	Measured in milligrams.	Water-soluble.	Folic acid produces a remission in pernicious anæmia, nutritional macrocytic anæmia and the anæmia of sprue, but has no effect on the neurological complications of pernicious anæmia.	Yeast, liver, kidney, green leaves.

	Inositol.	Pure inositol (cyclo-hexane-hexol).	Measured in milligrams or grams.	Water-soluble.	Increased gastric emptying time in dogs. Unknown in man.	Fruits, cereals, yeast.
	Choline.	Pure choline.	Measured in milligrams.	Water-soluble.	Deposition of excess fat in liver.	Egg yolk, liver, kidney, wheat germ, green leaves, peas and beans.
	Biotin (Coenzyme R).	Crystalline biotin.	Measured in milligrams or micrograms.	Water-soluble.	Dermatitis, arrest of growth and spastic gait in rats. Possibly dermatitis in man.	Yeast, liver, kidney, eggs, peas, cocoa, cereals, meat. Avidin in raw egg white, combines with biotin in other foods and renders it unavailable.
E	Alpha, beta, and gamma tocopherols.	—	Amount which, when administered orally, has the same specific activity as 1 mg. of synthetic, racemic alpha-tocopherol acetate in preventing resorption-gestation in rats deprived of vitamin E.	Fat-soluble.	Sterility in male rats. Failure of female rats to carry pregnancy to term. Muscular dystrophy in many animals and possibly also in man.	Wheat germ. Green leafy vegetables, especially lettuce.
K	2-methyl-3-phytyl-1:4-naphthoquinone.	Pure vitamin K.	Measured in micrograms or milligrams.	Fat-soluble.	Essential for the formation of prothrombin and hence for normal blood coagulation.	Green leaves, especially spinach.

Fig. 1.

BOOTHBY AND SANDIFORD'S NOMOGRAPH

The weight in pounds and kilograms is shown on Scale I. The height in inches and centimetres is shown on Scale II. The surface area in square metres is shown on Scale III.

Directions.—Keep the chart flat. Use a flexible ruler with a straight edge, or a strip of stiff paper, such as a postcard. Locate the position of the weight and height on Scales I and II respectively. Apply the straight edge of the ruler, and note where it cuts Scale III. Read the figure on Scale III, which will give the surface area of the body in square metres.

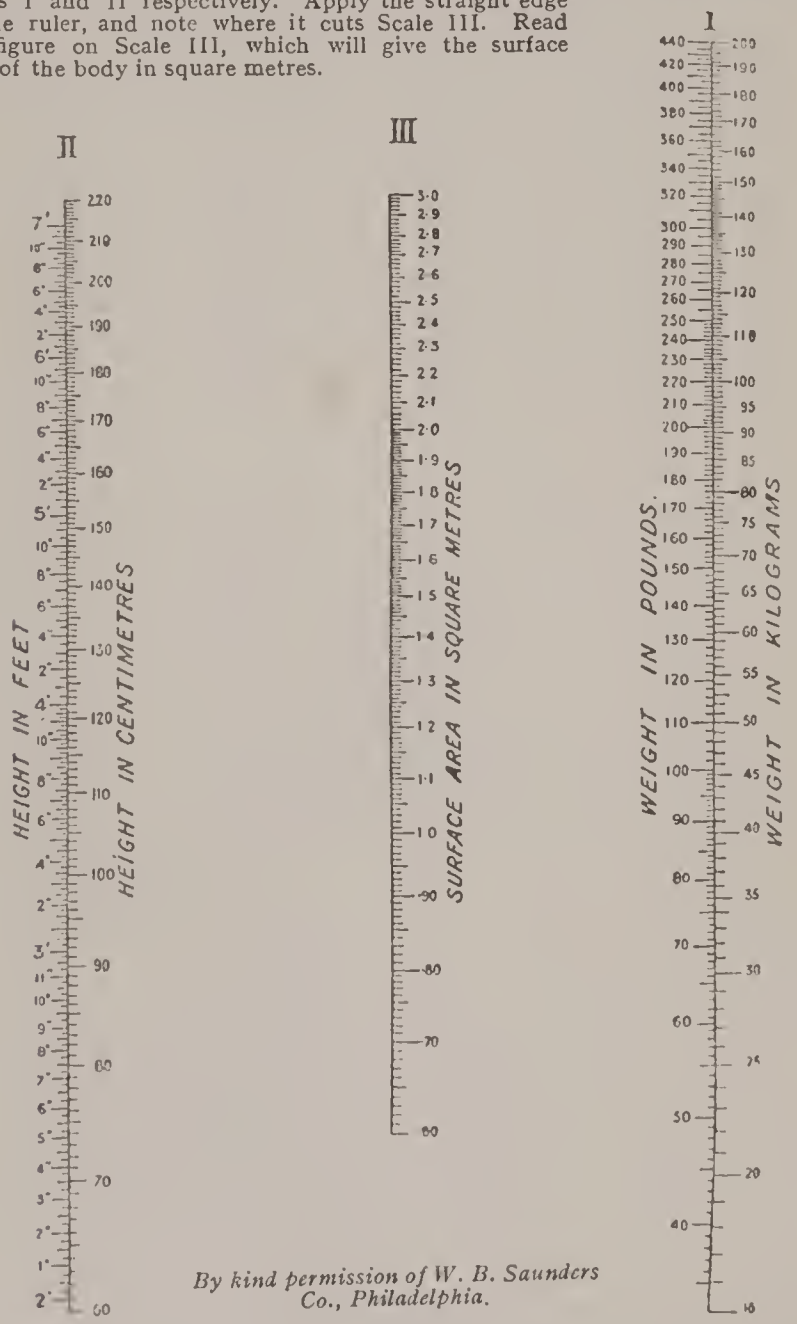

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TABLE IX

BASAL METABOLISM OF CHILDREN AND ADULTS

(Calories per square metre per hour)

Age	Males	Females
5 years	53·0	51·5
6 ,,	53·0	50·5
7 ,,	52·0	49·5
8 ,,	51·0	48·0
9 ,,	50·0	46·5
10 ,,	49·0	45·5
11 ,,	48·5	44·5
12 ,,	47·5	43·0
13 ,,	47·0	42·0
14 ,,	46·0	41·0
15 ,,	45·0	39·5
16 ,,	44·0	38·5
17 ,,	43·5	37·5
18 ,,	42·5	37·0
19 ,,	42·0	37·0
20–30 ,,	39·5	37·0
30–40 ,,	39·5	36·5
40–50 ,,	38·5	36·0
50–60 ,,	37·5	35·0
60–70 ,,	36·5	34·0
70–80 ,,	35·5	33·0

(From *Sage Normal Standards* of Dubois and Boothby and Sandiford, 1929.)

The surface area in square metres may be obtained from Boothby and Sandiford's Nomograph (p. 310).

TABLE X

RECOMMENDED DAILY ALLOWANCE

Adapted from the Dietary Recommendations of the Food an

	Calories	Protein, g.	Calcium, g.
Man (70 *kg.*).			
Sedentary	2,400	70	1·0
Moderately active	3,000	70	1·0
Very active	4,500	70	1·0
Women (56 *kg.*).			
Sedentary	2,000	60	1·0
Moderately active	2,400	60	1·0
Very active	3,000	60	1·0
Pregnancy (latter half)	2,400	85	1·5
Lactation..	3,000	100	2·0
Children up to twelve years.			
Under 1 year	110 per kg.	3·5 per kg.	1·0
1–3 years	1,200	40	1·0
4–6 years	1,600	50	1·0
7–9 years	2,000	60	1·0
10–12 years	2,500	70	1·2
Children over twelve years.			
Boys 13–15 years	3,200	85	1·4
16–20 years	3,800	100	1·4
Girls 13–15 years	2,600	80	1·3
16–20 years	2,400	75	1·0

Note.—400 I.U. Vitamin D should be supplied daily to women during th

FOR SPECIFIC NUTRIENTS

Nutrition Board of the National Research Council, U.S.A., 1948

Iron, mg.	Vitamin A, I.U.	Aneurin (Vitamin B_1), mg.	Riboflavin (Vitamin B_2), mg.	Nicotinic Acid, mg.	Ascorbic Acid (Vitamin C), mg.
12	5,000	1·2	1·8	12	75
12	5,000	1·5	1·8	15	75
12	5,000	1·8	1·8	18	75
12	5,000	1·0	1·5	10	70
12	5,000	1·2	1·5	12	70
12	5,000	1·5	1·5	15	70
15	6,000	1·5	2·5	15	100
15	8,000	1·5	3·0	15	150
6	1,500	0·4	0·6	4	30
7	2,000	0·6	0·9	6	35
8	2,500	0·8	1·2	8	50
10	3,500	1·0	1·5	10	60
12	4,500	1·2	1·8	12	75
15	5,000	1·5	2·0	15	90
15	6,000	1·7	2·5	17	100
15	5,000	1·3	2·0	13	80
15	5,000	1·2	1·8	12	80

latter half of pregnancy and lactation, and to children up to twenty years.

TABLE XI

Calorie Intakes in Relation to Age and Sex

Age last birthday, years	Average Daily Calorie Intake	
	Boys	Girls
1	1,050	1,050
2	1,260	1,260
3	1,470	1,470
4	1,650	1,650
5	1,800	1,800
6	1,950	1,920
7	2,070	2,000
8	2,180	2,100
9	2,300	2,200
10	2,420	2,250
11	2,550	2,300
12	2,670	2,400
13	2,750	2,450
14	3,000	2,550
15	3,300	2,550
16	3,300	2,550
17	3,300	2,550
18	3,300	2,550
Man or woman	3,000	2,200

(These values are taken from Widdowson, E. M. (1947), *A Study of Individual Children's Diets*, M.R.C. Special Report Series, No. 257.)

TABLE XII

CALORIES EXPENDED PER HOUR, OVER AND ABOVE THE BASAL METABOLISM, IN VARIOUS ACTIVITIES

General and Recreation	
Sitting at rest	30
Standing	40
Dressing and undressing	50
Walking, 2·6 miles per hour	140
,, 3·75 ,, ,,	240
,, 5·3 ,, ,,	580
Running	500
Swimming, 2 miles per hour	550
Cycling	175
Boxing	800
Dancing, foxtrot	240
,, waltz	200
Driving car	60
Playing piano	55
,, ,, (Liszt)	140
Domestic	
Sewing	40
Dish-washing	70
Sweeping floor	100
Peeling potatoes	40
Employments	
Typewriting, ordinary	40
,, rapid	70
Writing	30
Tailoring	80
Painting furniture	100
Carpentry	140–180
Metal work	180
Blacksmith	280–350
Stone-masonry	330
Sawing wood	400
Laundress	120–210
Coalmining	110
,, cutting	100–140
,, timbering	200

(From Marrack, J. R., *Food and Planning*, 1942.)

TABLE XIII

SUMMARY OF CHIEF DIGESTIVE ENZYMES

	Enzymes	Where chiefly found	Action
Act on Carbohydrates	Ptyalin (salivary amylase)	Salivary secretions.	Converts starch to maltose.
	Amylase (pancreatic amylase).	Pancreatic juice.	Converts starch to maltose.
	Invertase (sucrase)	Intestinal juice.	Converts sucrose to glucose and fructose.
	Maltase ..	Intestinal juice.	Converts maltose to glucose.
	Lactase ..	Intestinal juice.	Converts lactose to glucose and galactose.
Act on Fats	Lipases ..	Gastric (?) and pancreatic juices.	Splits fats to fatty acids and glycerol.
Act on Proteins	Pepsin ..	Gastric juice.	Splits proteins to proteoses and peptones.
	Trypsin ..	Pancreatic juice.	Splits proteins to proteoses, peptones, polypeptides and amino acids.
	Erepsin ..	Intestinal juice.	Splits peptones to amino acids and ammonia.

(Sherman, *Chemistry of Food and Nutrition*, 5th Ed., 1937.)

TABLE XIV

WEIGHTS AND MEASURES

Metric measure of weight

1,000 micrograms (μg. or γ)	= 1 milligram
1,000 milligrams (mg.)	= 1 gram
1,000 grams (g.)	= 1 kilogram
1,000 kilograms (kg.)	= 1 tonne

Avoirdupois weight	Metric equivalent in grams
1 oz.	28·4 = 30 approx.
16 oz. (1 lb.)	454
14 lb. (1 stone)	6·35 kg.
10 stone (140 lb.)	63·5 kg.
11 stone (154 lb.)	70 kg. approx.

Metric measure of weight	Avoirdupois equivalent
1 g.	0·035 oz. or 15·4 grains
100 g.	3·5 oz.
1 kg. (1,000 g.)	2·205 lb.

Metric linear measure

10 millimetres (mm.)	= 1 centimetre
100 centimetres (cm.)	= 1 metre
1,000 metres (m.)	= 1 kilometre (km.)

Linear measure	Metric equivalent in centimetres
1 inch.	2·54
12 inches (1 foot).	30·48
3 feet (1 yard).	91·44

Metric measure of length	Imperial equivalent
1 millimetre	0·03937 inch
1 centimetre	0·3937 inch
1 metre	39·3701 inches 3·2808 feet 1·0936 yards

Metric measure of capacity

1,000 cubic millimetres (c.mm.)	= 1 cubic centimetre
1,000 cubic centimetres (c.c.) or millilitres (ml.)	= 1 litre (l.)

Fluid measure	Metric equivalent in cubic centimetres (millilitres)
1 fluid oz.	28·4 = 30 approx.
16 fluid oz. (1 U.S. pint)	454
20 fluid oz. (1 Imperial pint)	568·3

Metric measure of capacity	Imperial fluid equivalent
1 cubic centimetre or millilitre	0·035 fluid oz. or 17·0 minims
1 litre (1,000 c.c.)	35·2 fluid oz.

Factors for converting from one scale to another

To convert	grams to ounces	× 0·035
,,	kilograms to pounds	× 2·205
,,	ounces to grams	× 28·4
,,	pounds to kilograms	× 0·454
,,	cubic centimetres to fluid ounces	× 0·035
,,	litres to fluid ounces	× 35·2
,,	fluid ounces to cubic centimetres	× 28·4
,,	Imperial pints to litres	× 0·568

Approximate value of domestic measures

Liquids

Tumbler	= 8–10 fluid oz.
Breakfast-cup	= 5–8 ,,
Teacup	= 3–5 ,,
Eggcup	= 1 ,,
Tablespoon	= ½ ,,
Dessertspoon	= ¼ ,,
Teaspoon	= ⅛ ,,

Dry Materials

Breakfast-cup	= 7 oz.
Teacup	= 4 oz.
Tablespoon	= 1 oz.
Dessertspoon	= ½ oz.
Teaspoon	= ¼ oz.
Tablespoon jam or treacle	= 2 oz.

1 new penny weighs ⅓ oz.
,, halfpenny weighs ⅕ oz.

Note.—In the case of suet, rice, sugar, and similar materials the measure should be taken level with the rim of the spoon. For flour and similar soft materials the measure should be heaped as high above the rim as the depth of the spoon below.

Temperature Scales

	Fahrenheit (F.)	Centigrade (C.)	Reaumur (R.)
Freezing-point ..	32°	0°	0°
Boiling-point ..	212°	100°	80°
Normal body temperature	98·4°	37°	29·6°

Conversion from one scale to another

$$C=\tfrac{5}{9}(F-32)=\tfrac{5}{4}R$$
$$F=\tfrac{9}{5}C+32=\tfrac{9}{4}R+32$$
$$R=\tfrac{4}{5}C=\tfrac{4}{9}(F-32)$$

TABLE XV

*WEIGHT-HEIGHT-AGE TABLES FOR MEN AND WOMEN**

Height, ft.	Height, in.	Weights according to Age Period in Pounds								
		15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 54	55 to 59
MEN										
4	11	111	117	122	125	127	130	132	133	134
5	0	113	119	124	127	129	132	134	135	136
5	1	115	121	126	129	131	134	136	137	138
5	2	118	124	128	131	133	136	138	139	140
5	3	121	127	131	134	136	139	141	142	143
5	4	124	131	134	137	140	142	144	145	146
5	5	128	135	138	141	144	146	148	149	150
5	6	132	139	142	145	148	150	152	153	154
5	7	136	142	146	149	152	154	156	157	158
5	8	140	146	150	154	157	159	161	162	163
5	9	144	150	154	158	162	164	166	167	168
5	10	148	154	158	163	167	169	171	172	173
5	11	153	158	163	168	172	175	177	178	179
6	0	158	163	169	174	178	181	183	184	185
6	1	163	168	175	180	184	187	190	191	192
6	2	168	173	181	186	191	194	197	198	199
6	3	173	178	187	192	197	201	204	205	206
WOMEN										
4	11	110	113	116	119	122	126	129	131	132
5	0	112	115	118	121	124	128	131	133	134
5	1	114	117	120	123	126	130	133	135	137
5	2	117	120	122	125	129	133	136	138	140
5	3	120	123	125	128	132	136	139	141	143
5	4	123	126	129	132	136	139	142	144	146
5	5	126	129	132	136	140	143	146	148	150
5	6	130	133	136	140	144	147	151	152	153
5	7	134	137	140	144	148	151	155	157	158
5	8	138	141	144	148	152	155	159	162	163
5	9	141	145	148	152	156	159	163	166	167
5	10	145	149	152	155	159	162	166	170	173
5	11	150	153	155	158	162	166	170	174	177
6	0	155	157	159	162	165	169	173	177	182

The height includes ordinary shoes and the weight includes ordinary indoor clothing.

* From the publications of the Metropolitan Life Insurance Company (quoted in Stern's *Applied Dietetics*, 3rd Ed. ,1949).

TABLE XVI

MEAN HEIGHTS AND WEIGHTS OF CHILDREN

Age last birthday, years	Height				Weight			
	Boys		Girls		Boys		Girls	
	in.	cm.	in.	cm.	lb.	kg.	lb.	kg.
4	41·0	104	41·0	104	38·5	17·5	37·5	17·0
5	44·0	112	43·5	111	43·0	19·6	42·0	19·0
6	46·5	118	46·0	117	48·0	21·7	46·5	21·1
7	48·5	123	48·0	122	52·5	23·9	51·5	23·4
8	50·5	129	50·0	128	58·5	26·4	57·0	25·9
9	52·5	134	52·0	133	64·5	29·1	63·5	28·8
10	54·5	138	54·5	138	70·0	31·8	70·0	31·8
11	56·5	143	57·0	144	77·0	34·8	78·0	35·7
12	58·5	148	59·0	150	85·0	38·4	89·0	40·4
13	60·5	154	61·0	155	95·0	43·0	99·0	44·8
14	63·0	160	62·0	158	107·0	48·4	106·0	48.2
15	66·0	168	63·0	160	123·5	56·0	114·0	51·8
16	67·5	172	63·5	161	133·0	60·4	116·5	52·8
17	68·5	174	63·5	161	139·0	63·0	117·5	53·2

These values are taken from O'Brien, R., Girshick, M. A., and Hunt, E. P. (1941), " Body Measurements of American Boys and Girls for Garment and Pattern Construction," *Misc. Publ. U.S. Dept. Agric.*, No. 366, Washington, D.C.

TABLE XVII

NORMAL FINDINGS AND THEIR DEVIATIONS IN DISEASE

	Normal Range		Deviation in Disease	
			Level increased	Level decreased
General				
Basal metabolic rate	See Table IX, p. 311.		Hyperthyroidism. Leukæmia. Fever.	Undernutrition. Myxœdema. Cretinism.
Blood pressure ..	Systolic, 110–140 mm. Hg. Diastolic, 70–90 mm. Hg.		Chronic interstitial nephritis and often for other unknown causes.	Addison's disease. Diabetic coma.
Blood	Whole Blood	Serum or Plasma		
Hæmoglobin ..	Men 13–16 g. per 100 c.c. Women 12–14 g. per 100 c.c.	—	Diabetic coma. Diarrhœa and vomiting Dehydration. Shock. Polycythæmia.	Anæmia secondary to blood loss, deficient iron intake or absorption. Pernicious anæmia. Hæmorrhage. Carcinoma.
Red blood cells ..	Men 5·0–5·5 million per cubic mm. Women 4·5–5·0 million per cubic mm.	—	Diabetic coma. Diarrhœa and vomiting. Dehydration. Shock. Polycythæmia.	Pernicious anæmia; to a lesser extent all forms of secondary anæmia. Hæmorrhage.
Sugar	Fasting 80–120 mg. per 100 c.c. After food up to 180 mg. per 100 c.c. (arterial), 150 mg. per 100 c.c. (venous).	Fasting 80–120 mg. per 100 c.c. After food up to 180 mg. per 100 c.c. (arterial), 150 mg. per 100 c.c. (venous).	Untreated or incompletely controlled diabetes mellitus. Hyperthyroidism.	Overdose of insulin. Addison's disease. Severe undernutrition.
Urea	14–40 mg. per 100 c.c.	14–40 mg. per 100 c.c.	Acute and chronic interstitial nephritis. Anuria due to mismatched transfusions, stones, surgical interference with the urinary tract, abortion. Diarrhœa and vomiting. Dehydration. As a result of taking a high protein diet.	Pregnancy. Patients taking low protein diets.

Proteins	—	6–8 g. per 100 c.c., made up of: Albumen 4–5 g. per 100 c.c. Globulin about 2·5 g. per 100 c.c.	*Diabetic coma. Acute diarrhœa and vomiting. Dehydration. Sometimes shock.	*Chronic parenchymatous nephritis. Undernutrition. After severe hæmorrhage.
Uric acid	2–4 mg. per 100 c.c.	2–4 mg. per 100 c.c.	Gout. Eclampsia. Nephritis. Arthritis.	—
Creatinine	0·7–2 mg. per 100 c.c.	0·7–2 mg. per 100 c.c.	Nephritis.	—
Calcium	5–7 mg. per 100 c.c.	9–11 mg. per 100 c.c.	*Overactivity of the parathyroid glands. Administration of an excess of parathyroid extract.	*Removal of parathyroids. Sprue. Cœliac disease. Sometimes in rickets and osteomalacia. Renal rickets.
Phosphorus (inorganic)	Adults 2–4 mg. per 100 c.c. Children. 4–6 mg. per 100 c.c.	Adults 2–4 mg. per 100 c.c. Children 4–6 mg. per 100 c.c.	Chronic nephritis. Diabetic coma. During healing of major fractures.	Rickets. Osteomalacia. Overactivity of the parathyroid glands.
Sodium (as Na) ..	170–225 mg. per 100 c.c.	325–350 mg. per 100 c.c.	*Dehydration.	*Addison's disease. Intestinal obstruction. Acute gastro-enteritis. Diabetic coma. Severe sweating with unrestricted water intake. Sometimes nephritis.
Potassium	150–250 mg. per 100 c.c.	18–21 mg. per 100 c.c.	*Addison's disease. Intestinal obstruction.	*Familial periodic paralysis.
Chloride (as Cl) ..	270–320 mg. per 100 c.c.	340–380 mg. per 100 c.c.	*Cardiac disease. Severe anæmia. Dehydration.	*Intestinal obstruction. Severe protracted vomiting. Severe burns. Pneumonia. Sometimes untreated diabetes, nephritis, Addison's disease. Severe sweating with unrestricted water intake.
Diastase	—	2–12 units (Wohlgemuth).	*Always in acute pancreatitis. Sometimes in chronic pancreatitis.	—

* Applies to serum or plasma and not to whole blood.

TABLE XVII—*continued*

	Normal Range		Deviation in Disease	
			Level increased	Level decreased
Blood	Whole Blood	Serum or Plasma		
Alkaline phosphatase	—	*Adults* 0·10–0·21 Kay Units. 1·5–4 Bodansky Units. 5–10 King and Armstrong Units. *Infants* 0·17–0·34 Kay Units. 5–13 Bodansky Units. 7–15 King and Armstrong Units.	*Bone diseases such as: Rickets, osteomalacia, osteitis deformans, generalised osteitis fibrosa. Ditto.	—
Total cholinesterase	—	60–90 Units (1 unit = c.mm. CO_2 liberated by 1 c.c. serum in 1 minute at 37° C.).	—	*Under-nutrition. Thyrotoxicosis. Liver diseases such as cirrhosis, hepatitis, hepatic jaundice.
Cholesterol	100–200 mg. per 100 c.c.	100–220 mg. per 100 c.c.	Pregnancy. Obstruction of bile ducts. Uncontrolled diabetes. Nephritis with œdema. Sometimes in gout.	Severe anæmia. Pernicious anæmia. Severe sepsis. Severe undernutrition.
Alkali reserve ..	—	53–77 vols. O_2 per cent.	*Alkalosis due to vomiting.	*Acidosis due to diabetes. Addison's disease, or diarrhœa. Alkalosis due to overbreathing.
Vitamin A	—	40–100 I.U. per 100 c.c.	—	*Cirrhosis. Infective hepatitis. Myxœdema. Dietary deficiency.
Ascorbic acid ..	—	0·5–1·4 mg. per 100 c.c.	—	*Infection. Dietary deficiency.
Prothrombin ..	Clotting time compared with normal.	—	—	Vitamin K deficiency. Hæmorrhagic disease of the newborn. Severe liver damage.

* Applies to serum or plasma and not to whole blood.

TABLE XVIII

NORMAL AND ABNORMAL EXCRETIONS

Urine

Normal volume: 1–2 litres a day.

Raised in diabetes mellitus and diabetes insipidus; often in chronic interstitial nephritis.

Lowered in dehydration; failing circulation; insufficient fluid intake.

Normal specific gravity: 1·008–1·030.

Raised in diabetes mellitus; dehydration.

Lowered in diabetes insipidus; excess fluid intake.

Abnormal urinary constituents:

Glucose in diabetes mellitus; Grave's disease; sometimes also in healthy persons (renal glycosuria); pregnancy.

Lactose, sometimes in late pregnancy, often in lactation.

Acetone bodies in untreated diabetes mellitus and any other form of carbohydrate starvation, whatever the cause.

Albumen, casts, etc., in all types of nephritis, including albuminuria of pregnancy; sometimes also in normal young adults.

Bile pigments and bile salts in obstructive jaundice.

Absence of chloride in pneumonia, vomiting, diabetic coma, and other salt-deficient conditions; also after the administration of a low salt diet.

Fæces

Normal fat content: Not more than one-quarter of the dried fæces should be fat, and, of this, not more than one-quarter should be undigested fat.

Abnormal constituents in fæces:

Excess of undigested fat in obstructive pancreatitis and chronic pancreatitis.

Excess of digested fat (fatty acids) in jaundice, cœliac disease, sprue.

Starch in chronic pancreatitis and early stages of severe diarrhœa; also in fibrocystic disease of the pancreas.

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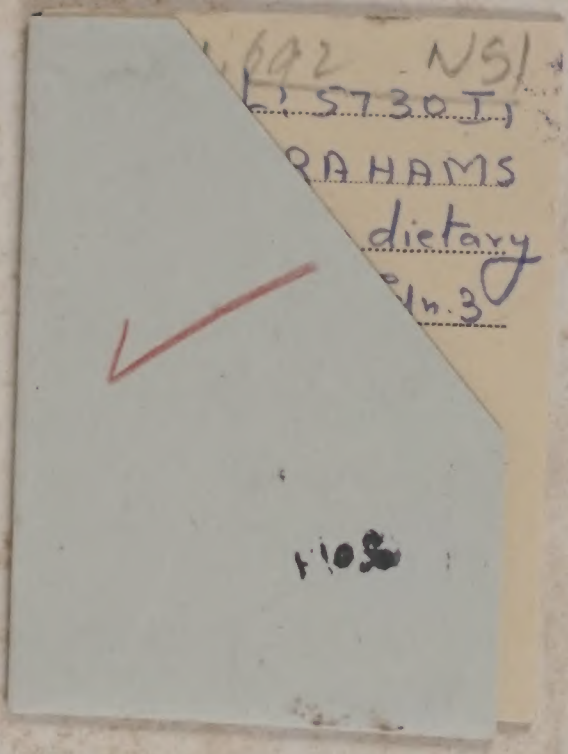
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